DOCUMENT RESUME

ED 472 232 IR 021 356

AUTHOR	Barrett, Helen C., Ed.
TITLE	Electronic Portfolios. [SITE 2002 Section].
PUB DATE	2002-03-00
NOTE	79p.; In: Proceedings of SITE 2002: Society for Information Technology & Teacher Education International Conference (13th, Nashville, TN, March 18-23, 2002); see IR 021 349.
AVAILABLE FROM	Association for the Advancement of Computing in Education, P.O. Box 3728, Norfolk, VA 23514-3728. Web site: http://www.aace.org.
PUB TYPE	Collected Works - General (020) -- Speeches/Meeting Papers (150)
EDRS PRICE	EDRS Price MF01/PC04 Plus Postage.
DESCRIPTORS	*Computer Uses in Education; *Educational Technology; Faculty Development; Higher Education; *Portfolios (Background Materials); Teacher Education; *Technology Uses in Education; World Wide Web
IDENTIFIERS	*Electronic Portfolios

ABSTRACT

This document contains the following papers on electronic portfolios from the SITE (Society for Information Technology & Teacher Education) 2002 conference: (1) "What Is the Perceived Value of Creating Electronic Portfolios to Teacher Credential Candidates?" (Valerie Amber and Brenda Czech); (2) "Development and Use of Electronic Portfolios in Preservice Education" (Shirley P. Andrews, Adele Ducharme, and Carolyn Cox); (3) "The Integration of the Portfolio-Based Intel 'Teach to the Future' Model To Enhance Pre-Service Teacher Education Program" (Maria Bhattacharjee, Irene Chen, and Susan S. Paige); (4) "Creating Meaningful Learning Environment Using ICT" (Madhumita Bhattacharya); (5) "Electronic Portfolios in Pre-Service Education--Distinguishing between Process and Product" (Christine Anne Brown); (6) "The Intimacies of Electronic Portfolios: Confronting Preservice Teachers' Personal Revelation Dilemma" (Joanne M. Carney); (7) "Web-Based Electronic Portfolios: A Systemic Approach" (Paul Clark, Neal Topp, and Bob Goeman); (8) "Using Digital Video Tools To Promote Reflective Practice" (Ann Cunningham and Sandra Benedetto); (9) "Promoting Standards, Assessment, and Technology Competencies through Digital Portfolios" (Harold L. Daniels); (10) "Electronic Portfolios in Evolution" (Roger Olsen, Nancy Wentworth, and David Dimond); (11) "The RIMS/BTSA Electronic Portfolio for Teacher Professional Development" (Zeno Franco, Linda Scott-Hendrick, and Scott Lowder); (12) "Electronic Portfolio: Where Should the Portfolios Be Stored?" (David Hofmeister and Andrew King); (13) "A Large-Scale Web-Based Electronic Portfolio System: Developing the Purdue Electronic Portfolio (PEP) System" (James D. Lehman, David O'Brien, and Joy Seybold); (14) "Reflection as the Foundation for E-Portfolios" (Barbara B. Levin and Jean S. Camp); (15) "Electronic Portfolios in Teacher Education: From Design to Implementation" (Laurie Mullen, Amy Doty, and Richard Rice); (16) "The Model of a Teacher's Electronic Portfolio: Enhancing Instructional Planning" (Ju Park); (17) "Year Two of the Electronic Portfolio Project at the University of Florida" (Gail Ring); (18) "The Good, the Bad, & the Ugly: Lessons Learned from Electronic Portfolio Implementation" (Ann Rose); (19) "Promoting Paperless Portfolios as Assessment in Graduate Level TESOL Programs" (Annis

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N. Shaver and Mary A. Avalos); and (20) "Electronic Portfolios on a Grand Scale" (Nancy Yost, Dolores Bryzcki, and Lloyd C. Onyett). Several brief summaries of conference presentations are also included. Most papers contain references. (MES)

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Electronic Portfolios (SITE 2002 Section)

Helen C. Barrett. Ed.

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SECTION EDITOR:
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> An innovation of the early 1990s, an electronic portfolio combines the use of electronic technologies to create and publish a portfolio that most likely will be read with a computer or viewed with a VCR [or DVD player]. (Barrett, 2002)

There were more than 40 sessions selected under the category of Electronic Portfolios. This exploding quantity, and the content covered, represents the current state of the art of electronic portfolio implementation in Teacher Education in 2002. An analysis of these papers, roundtables, poster sessions and tutorials, shows a variety of purposes and different tools used to construct electronic portfolios, and represent levels of program implementation that closely follows the normal stages in the adoption of innovations. It is also clear that NCATE 2000 has been a major motivator and the federal PT3 program has been a major benefactor in the implementation of electronic portfolios in U.S. Teacher Education.

It is important to emphasize that the electronic portfolios that most of these papers describe are, first and foremost, portfolios in the classic definition of the term, which just happen to be developed with a variety of technological tools and stored in a variety of electronic containers: "purposeful collections of work that demonstrate efforts, progress and achievement." The components of good portfolio development have been addressed in many of these papers, including purpose, collection, selection, and reflection on work demonstrating achievement of standards, and some papers focus on the role of the portfolio in ongoing professional development.

Purpose of the Portfolios

There are many purposes for portfolios, which can be for learning, formative or summative assessment, and employment. Most of these papers describe electronic assessment portfolios used primarily for demonstrating student achievement of teaching standards, with the INTASC principles most frequently mentioned. One secondary purpose often described was the demonstration of technology competency as described in ISTE's National Educational Technology Standards (NETS). One paper (Levin) provided an in-depth description of the process their students use to reflect on their work, based on the North Carolina Public Schools' model of self-assessment. The five-stage reflection cycle describes a well-grounded support system to guide students through this often difficult process.

Tools used for Development and Publishing

At this stage of electronic portfolio implementation, these papers described variations on two approaches:

1. Using common software to construct hyper-linked portfolios (i.e., WWW pages created with a variety of templates and authoring tools was most often mentioned; other software included PowerPoint and other Microsoft Office software, and Adobe Acrobat);

2. Using WWW-accessible databases to collect the evidence and provide an online structure for the portfolio.

Several papers discussed the role of digital video in a student's portfolio, and one paper (Cunningham) explored the emerging use of DVD-R to store this video. One paper discussed how and where to store the portfolio. Another raised issues of privacy and confidentiality in portfolios published on the Internet.

Types of Presentations

Most of these papers are case studies of implementation decisions and strategies in a School, College or Department of Education. A few Roundtable sessions propose to explore these strat-

egies with interested participants. Only three of these papers reported on data collected and analyzed about electronic portfolio development, beyond the exploration of implementation issues.

Levels of Program Implementation

A majority of these papers have described implementation strategies that closely follow the Phases of Instructional Evolution in Technology-Intensive Environments outlined by Dwyer et.al. in the ACOT Research: Entry, Adoption, Adaptation, Appropriation, Invention. Many of the papers represented case studies of entry and early adoption of electronic portfolios in teacher education programs, including a description of the decisions made regarding the technology tools to be used for "electronic" component of these portfolios. A few papers document the process of adaptation and appropriation (widespread use) of the electronic portfolios. At least one program has changed the choice of technology tools based on their experience and further development (invention). There is very limited data collected and reported about the efficacy of electronic portfolio development and publishing. One paper (Barrett) reported on student responses to a preliminary survey, with an invitation for more widespread data collection across education programs nationwide.

Issues

One study (Carney) raised issues about how the tool chosen for authoring (WWW pages) afforded and constrained the portfolio author in representing and communicating teacher knowledge, revealing a tool-related personal revelation dilemma. As she states, "Teacher education programs ought to be aware of this dilemma and take measures to ameliorate preservice teachers' concerns about exposing problems of practice to potentially critical portfolio readers." Another paper reported similar issues with publishing portfolios on the Internet. In the two studies that reported on surveys of teacher education candidates, there is evidence that the skills gained in the process of developing electronic portfolios would be useful in classroom instruction. There is another issue that emerges when addressing the technology skills gained from the process of constructing these portfolios: Do students provided with a static template or a dynamic web-based database develop the same technology skills as those students who must create their own structure with common software tools?

Conclusions

Some interesting issues appear in these papers. In the history of human development, our tools have often shaped the outcomes of our tasks and, while many programs require WWW-based portfolios, Carney suggests a problem with that tool limiting the openness of the reflections, which Levin points out is the most important purpose of this process.

While visiting Alverno College, I heard about Dr. Mary Diez' three metaphors for thinking about portfolios: mirror, map, and sonnet. Based on these metaphors, some questions come to mind. When the portfolio is highly structured (the sonnet), often as in an online data base to meet the organization's need for uniformity in assessment data, does it lose the creativity of expression that has been a hallmark of paper portfolios for years? Where is the sense of ownership of the portfolio creator in constructing their own paths through their work (creating their own map)? What are the trade-offs between scaffolding the development process with templates or highly structured data bases, and students gaining the knowledge that can result from the process of constructing their own hyper-linked portfolios (seeing their work in new ways— the mirror) while linking and reflecting on their work? Also, at the risk of editorializing, should these online assessment management systems really be called electronic portfolios?

There is a need for more data collection and longitudinal research on the perceptions of teacher candidates and faculty on the value and purpose of electronic portfolios, and whether the benefits extend to the classroom and enhance student learning. The question of efficacy of effort must also be addressed: only one study included here compares paper-based and digital portfolios. The time is right to move beyond implementation issues to research and evaluation.

What is the Perceived Value of Creating Electronic Portfolios to Teacher Credential Candidates?

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Abstract: This session presents research findings from a study designed to determine the following: a) the ways in which, and b) to what extent preservice teachers value the experience of creating an electronic portfolio. With the new focus on technology's standards for teachers, this research is an initial attempt to determine what motivational factors encourage students to create an electronic portfolio for a teacher education credential. The process of developing electronic teaching portfolios can document evidence of teacher competence and guide long-term professional development (Barrett, 2001). Its ability to provide teacher candidates with an opportunity to become reflective practitioners is evidenced to be one of its greatest advantages (Barrett, 2001). The research findings from this study will contribute to the knowledge base in regards to creating electronic portfolios, which will be useful for the planning and implementation of teacher training programs.

Introduction

During the past decade, the curriculum for preservice teachers has had to respond to the changing demographics in our student populations. As a result instructional methods for cross-cultural language and academic development was emphasized. Now, as we begin this new century, our curriculum needs have converged on yet another focus: technology integration into classroom learning. National and state standards regarding accountability in technology, cross-cultural language, and academic development have become a catalyst for preparing our teachers and America's youth for the new millennium.

Electronic portfolios have gained an accepted position to improve the interrelationship among technology, multicultural education and instructional theory and practice. It is evidenced in the products of learning that the process of creating a portfolio enhances the ability of each student teacher to articulate these ideas. In keeping with our commitment to model fair and equitable learning environments for all students, the faculty felt a need to include the preservice or newly in-service teachers into the planning and implementation of the electronic portfolio requirements.

Purpose of the Study

This session presents research findings from a study designed to determine the following: a) the ways in which, and b) to what extent preservice teachers value the experience of creating an electronic portfolio. With the new focus on technology's standards for teachers, this research is an initial attempt to determine what motivational factors encourage students to create an electronic portfolio for a teacher education credential.

The process of developing electronic teaching portfolios can document evidence of teacher competence and guide long-term professional development (Barrett, 2001). Its ability to provide teacher candidates with an opportunity to become reflective practitioners is evidenced to be one of its greatest advantages (Barrett, 2001). The

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research findings from this study will contribute to the knowledge base related to electronic portfolios, which will be useful for the planning and implementation of teacher training programs.

Theoretical Background

Research (Milman, 1999) has found that the student teachers' experience of creating electronic portfolios allows them to develop technology skills as well as reflect upon their coursework and collaborate with peers. The development of an electronic portfolio, if begun early in the teacher candidate's program, will allow for the growth of technology skills throughout their coursework. Findings indicate that by infusing technology throughout the program it is more likely that the candidate will use technology in their K-12 classroom when they begin to teach (Lawless et al., 2000). By creating electronic portfolios student teachers will be given opportunities to demonstrate their strengths in teaching skills, their understanding of instructional theory and application of instructional methods and their ability to use a variety of computer generated media. Graphics, sounds and animation can be included in their portfolio that can allow future employers to view the person in a richer context and aid them in gaining a better understanding of the student teacher's ability to apply theory into practice. Since the electronic portfolio allows them to express themselves in ways previously not possible, the electronic portfolio becomes a valuable tool to help them secure a teaching position in a district of their choice. This medium allows the student to learn more because it will encourage collaboration with peers and develop reflective practices. Its ability to provide teacher candidates with an opportunity to become "reflective practitioners" is evidenced to be one of its greatest advantages (Barrett, 2001). The inclusion of scanned pictures, teaching videos, reflection pieces and other artifacts allows the student teachers to evidence mastery of the NCATE technology standards as well as state teaching performance standards (Swain & Ring, 2000).

Methods

Teacher credential candidates enrolled in technology courses were given an opportunity to view several electronic portfolios. After the completion of this exercise they were administered a questionnaire.

In order to address the above issues a pilot survey was administered to teacher credential candidates (N=23, Age X=29) enrolled in a computer course to answer the following quantitative questions:

1) To what extent do teachers value the creation of electronic portfolios as a means to improve their technology skills?
2) To what extent do teachers value the creation of electronic portfolios as a professional development tool to enhance their ability to transfer instructional theory to solid, effective teaching practices?
3) To what extent do teachers report that an electronic portfolio would increase their employment opportunities?

To gain a better understanding of these teacher candidates' expressed attitudes the survey was followed up with a personal interview to answer the following qualitative questions:

4) In what ways do teachers value the creation of electronic portfolios as a means to improve their technology skills?
5) In what ways do teachers value the creation of electronic portfolios as a professional development tool to enhance their ability to transfer instructional theory to solid, effective teaching practices?
6) In what ways do teachers report that an electronic portfolio would increase their employment opportunities?

A questionnaire was administered to teacher candidates enrolled in a teacher credential program. This instrument checked for attitudinal measures by asking them to rank order seven outcome statements concerning their perceived value of the experience of creating an electronic portfolios. These outcomes were then evaluated statistically and clustered into the following three variables:

1) value for importance of improving technology skills,

2) value for importance of improving teaching abilities, and

3) value for importance of securing employment.

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One male and female was selected from each of the above three groups to participate in an interview. The number of times each individual stated they valued the electronic portfolio for improvement in one of the following areas was recorded each of the following: 1) technology skills 2) teaching abilities 3) job marketability.

Data Sources and Analysis

This quantitative/qualitative study employed a dual-based research approach. A survey was used to examine beginning teachers' perceptions of the value of the experience of creating an electronic portfolio. The survey questions were analyzed statistically in SPSS 10.0 using descriptive statistics. The data from the qualitative interviews were transcribed and coded into a Perceived Value Matrix.

Findings and Discussion

The statistically analysis revealed that preservice or newly inservice teachers were more likely to value the process of creating an electronic portfolio for their ability to *improve teaching* practices (X = 3.84) and specifically that it would provide an opportunity for them to participate in *reflective teaching practices* (X = 4.11). Furthermore, they indicated that they believed they would be *more likely to be hired* (X= 4.21) by a potential employer if they demonstrated advanced technology skills through the use of an electronic portfolio. The statistical analysis also implied that these teacher candidates believed that they would gain skills that would be *useful in classroom instruction* (X= 3.63).

This analysis indicates that teacher candidates perceive two of the most valuable outcomes of participating in the process of creating an electronic portfolio is: 1) that an electronic portfolio would provide them with feedback that would allow them reflect upon their teaching and "become a better educator," and 2) that they would be more likely to be hired since they would be demonstrating proficiency in technology that is assumed to be sought by potential employers.

At press time both the quantitative and qualitative data is continuing to be tabulated and analyzed. More detailed results will be available Spring 2002. Interested parties should contact the authors for further information: vamber@nu.edu or bczech@nu.edu.

Significance

An important outcome of this research is that it will enhance methods and techniques for the integration of technology in classroom learning, both at the teacher training level and in the K-12 classroom. Additionally, these findings will aid in the strategic planning and implementation for both the faculty and preservice teachers participating in teaching training programs.

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Development and Use of Electronic Portfolios in Preservice Education

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Abstract: This paper is a report on the development process and use of electronic portfolios in the teacher education program at Valdosta State University. Students entering the program begin the process of developing electronic portfolios in an introduction to education course. As they progress through their teacher preparation programs, students add narratives and artifacts to their portfolios to demonstrate and document their knowledge, skills, and dispositions within the undergraduate framework. The development of these portfolios is considered a continually evolving process. As preservice teachers move from the preservice teacher level to the student teaching level and on to the inservice teacher level, the goal is for these teachers to continue to demonstrate progress throughout their professional careers, through these or other portfolios.

Use of Portfolios

A professional portfolio is a collection of artifacts, evidence, and reflections documenting what one knows and is able to do in a professional field. The use of professional portfolios has become increasingly popular in the field of education, becoming a method for creating avenues for reflection and documentation of personal and professional growth and development for both preservice and inservice teachers. Teacher education programs are now considering portfolio development as a valuable process for documenting teaching performance (Costantino & De Lorenzo, 2002). According to Campbell, Cignetti, Melenyzer, Nettles, and Wyman (1997), portfolios are organized, goal-driven, and may be used to document professional growth and teaching competencies. The development of portfolios helps preservice teachers set goals for learning and review goals periodically throughout their teacher preparation programs.

Portfolios may also serve as an instrument for gaining a better understanding of preservice teachers' abilities by examining artifacts (tangible evidence of knowledge gained and skills mastered) they have chosen to use to document what they know and are able to do. Through portfolio documentation, different dimensions of a preservice teacher's preparation program may be elaborated to provide indicators of progress that can be measured. National, state or district standards may be used as a guide for deciding on the areas of assessment. As students near the completion of their teacher preparation programs, the portfolio becomes a tool for them to market themselves to potential employers. After graduation, the portfolio helps novice and veteran teachers

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continue in their professional growth as educators (Campbell et al., 1997). Lyons (1999) purported the process of developing portfolios helps beginning teachers articulate their teaching philosophy and develop their teaching techniques. Van Wagenen and Hibbard (1998) determined that inservice teachers, through the portfolio construction process, developed many effective strategies for studying student work and discovered important connections between teaching and learning. Similarly, Danielson (1996) stated teachers could use portfolios as a method for self-reflection and analysis, as a process to support mentoring and coaching relationships, and to strengthen a resume.

Electronic Portfolios

Similar to a paper-based professional portfolio model, an electronic portfolio is a carefully selected collection of exemplary artifacts that allows demonstration of one's best work and accomplishments. Electronic portfolios in a teacher education program provide an efficient method for displaying preservice teachers' work that meets high standards and documents growth throughout the program (Costantino & De Lorenzo, 2002). Electronic portfolios may exhibit benchmark performance measures for preservice teachers by allowing for the evaluation of the effectiveness of teaching strategies. Preservice teachers may also use artifacts that are similar in nature to show their progress towards meeting the standards of their programs. Electronic portfolios have several other advantages. Unlike using paper-based portfolios, the use of electronic portfolios is a multimedia approach that allows preservice teachers to present teaching, learning, and reflective artifacts in a variety of formats, such as graphics, audio and video, and text (Costantino & De Lorenzo, 2002). Artifacts may be easily inserted as a file, scanned, or uploaded to the portfolio. Also, electronic portfolios are easily accessible, can store multiple media, and are easy to update.

Using electronic portfolios also allows for cross-referencing of artifacts. The creation of meaningful links between all artifacts is possible, therefore documenting a preservice teacher's achieved competence in teaching at the end of his or her teacher preparation program. Ongoing documentation in the electronic portfolio contains the preservice teacher's best work and gives a portrait of his or her professional competence that can be built upon in the inservice field. According to McKinney (1998), teachers who demonstrate their competence in technology through the development of an electronic portfolio are more likely to incorporate technology into their own classrooms. Similarly, Goldsby and Fazal (2000) indicated student teachers must learn to effectively use technology in their preparation program because teachers with little or no experience with technology are less likely to incorporate its use in their classrooms.

Portfolio Development in Preservice Education

Portfolio development in the teacher education program at Valdosta State University (VSU) began as a pilot program in fall 1997. Using a paper-based model, students enrolled in the introduction to education course (the first education course for students) developed a notebook portfolio using a framework based on standards established by the Interstate New Teacher Assessment and Support Consortium (INTASC). The INTASC standards were chosen because they serve as the basis for VSU's College of Education's Conceptual Framework. The standards are generally applicable for teachers of all disciplines and all levels and are aligned with National Board for Professional Teaching Standards (NBPTS). To infuse additional technologies into the teacher education program the paper-based model was changed to an electronic format in fall 1999. Continuing to use the INTASC standards as a framework, a template was developed in Microsoft's FrontPage 2000. Currently, students enrolled in the introduction to education course use the template to begin the development of their electronic portfolios. The process begins in labs conducted during class meeting times. To gain access to the portfolio template students are provided a login name and a password. During labs faculty members who teach the introduction to education course provide basic instruction in FrontPage 2000. Portfolios at this level of development are identified as working portfolios in which faculty members require assignments that will be used as artifacts. Required assignments include a current resume and reflective writing activities, such as a philosophy of education and education dispositions. Students are encouraged to perceive their portfolio, not as a file of course projects and assignments, but a professional portfolio organized to document their professional growth and achieved competences in teaching. For viewing and grading purposes faculty members have access

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to their students' portfolios which are posted on VSU's College of Education website. Faculty members do not have access to students' passwords and may only view the portfolio, not open a student's web page folder. Portfolios are graded using a standard rubric.

As students continue to progress through their teacher preparation program they begin to include narratives and artifacts that may be assigned by faculty members who teach courses in their particular program or artifacts may be self-selected. Students are required to select artifacts that demonstrate evidence of an achieved goal or the attainment of particular knowledge and skills. Then, as students complete coursework and program requirements, they begin to revise and expand their portfolios as they identify and select artifacts from coursework and field experiences that document their knowledge, skills, and dispositions in relation to a particular standard and what they will know and be able to do upon completion of their program. Students are informed that artifacts will be self-selected for final development during the student teaching experience, reflecting students' individuality and autonomy as well as providing tangible evidence of the wide range of knowledge, dispositions, and skills they have developed and achieved as a growing professional. At this level the working portfolio becomes a professional portfolio containing a student's best work, providing a portrait of the student's professional competence, and can be used for assessment purposes. Portfolios at the student teaching level are graded using a standard rubric.

Students are encouraged to revise and expand their portfolio and use it as a teaching portfolio as they become professional educators. Reasons for this encouragement include the following: (a) many school systems who hire VSU's graduates are now requiring teachers to develop and maintain teaching portfolios; (b) students who are enrolled in VSU's graduate teacher education program are required to develop an electronic portfolio or continue their portfolio development initiated in their undergraduate programs if they are a graduate of VSU; (c) a requirement for National Board Certification is portfolio development and submission; and (d) some states require beginning teachers to submit portfolios during the first year or two as part of a state mandated induction program or to obtain teacher certification, whereas, other states, including Georgia, are considering implementing induction programs requiring submission of portfolios for certification purposes.

In VSU's teacher education program the development of a portfolio is considered a continually evolving process. As preservice teachers move from the preservice teacher level to the student teaching level and on to the inservice teacher level, the goal is for these teachers to continue to demonstrate progress throughout their professional careers, through these or other portfolios. The ability to reflect upon teaching practices and seek opportunities for professional growth are lifetime teaching goals that can possibly be achieved through maintaining a professional portfolio.

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The Integration of the Portfolio-based Intel "Teach to the Future" Model to Enhance Pre-service Teacher Education Program

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Abstract: Around the nation, school districts and teacher education programs have received the Intel "Teach to the Future with Support from Microsoft" grants and as a result, have participated in workshops to learn how to implement the portfolio-based modules into current curriculum. The Intel "Teach to the Future with Support from Microsoft" grant from Intel Corporation has also reached the teacher education programs in other countries. In spring 2001, four professors from the Department of Urban Education at the University of Houston Downtown received this Intel grant. In fall 2001, ten more faculty members from the department attended another Intel workshop offered at UHD. This training is having a positive impact in the way we prepare pre-service teachers as well as in the delivery of instruction. We hope our experience benefits other school districts and teacher education programs that may already be or may become involved in this grant project.

Introduction

University faculty members are at different levels in implementing technology to deliver their courses and prepare the students for the technology age. This situation is of primary importance in teacher preparation programs. Faculty in these departments must be leading the way in the use and teaching of technology since they are in charge of training teachers. The Intel "Teach to the Future with Support from Microsoft" grant has allowed the Urban Education Department at the University of Houston Downtown to continue training its faculty. This paper will include a general description of the Intel training, a brief description of the modules from the Intel binder, the team work of the professors in Urban Education Department to teach the modules, a showcase of some student work and electronic portfolios as artifacts of the grant implementation, and the monitoring of the imp lementation of the technology component in teachers' classrooms.

Description of Intel Training

In spring 2001, the Department of Urban Education at the University of Houston Downtown received the Intel "Teach to the Future with Support from Microsoft" grant. Four faculty members, each representing the math education program, the language arts and social studies education program, the technology education program, and the bilingual education program, participated in an intensive workshop held in Seattle, Washington. The training focuses on the integration of technology in the teacher education curriculum. The days were very well planned. The first day was a Friday. The meeting started at 8:00 a.m. and ended at 7:30 p.m. The group covered module 1. The team had the opportunity to discuss the technology initiatives in their universities over dinner. It was an interesting discussion since the people were from a variety of universities in the USA. The second day began at 8:00 a.m. with a

continental breakfast and ended at 7:30 p.m. with a required dinner. During the dinner, the discussion was about the role of students' sample works in the pre-service program. The participants went through modules 2, 3, and 4 during this day. The third day opened with a continental breakfast at 9:00 a.m. and ended at 4:00 p.m. The team covered modules 5 and 6. The last day began at 8:00 a.m. and ended at 4:00 p.m. The group covered modules 7, 8, 9, and 10. The afternoon was spent in showcasing the participants' work. Several forms were used to give feedback to each other. Some of the participants exchanged samples of their products to be shared with their students. The last 30 minutes were used for a general assembly where participants gave feedback about the training. The Intel trainers were very open to suggestions but the general opinion from the participants was that the training and the materials were excellent. It was the general consensus that it was a great addition to the curriculum for training teachers. One of the professors who attended the Seattle training from the Urban Education Department took upon herself the responsibility to organize an Intel training for the rest of the faculty in the department. This training was conducted in December 2001. Ten professors from the department participated as well as some professors from other universities in the USA. The Intel grant provides the Intel binders at no cost to the students in the programs for the term of the grant.

Brief Description of the Intel Binder

The Intel binder includes information for locating resources for electronic portfolios, creating student multimedia presentations, creating student publications, creating student web sites, developing plans for implementation, putting together electronic portfolios, and showcasing the electronic portfolios. The binder has ten modules. Each module has activities and homework. Module one is "Getting Started". It includes a general description of the Intel grant, creating a program folder, beginning the planning process for a unit, creating a multimedia presentation, and sharing a multimedia presentation with the class. The homework activities consist of exploring copyright laws related to computer and software use, locating curricular resource materials, and creating a works cited page. This last one will help to locate Internet addresses more easily and to cite the sources properly. Module two is "Locating Resources for Unit Portfolios". The activities include using directories and web search engines, locating Internet resources, and locating resources using Microsoft Encarta. The homework is evaluating resources on the Internet. Module three is "Creating Student Multimedia Presentations". The activities are creating a multimedia presentation, reflecting on the sample presentations, and revisiting the plan for the unit. The homework is creating an evaluation tool for the multimedia presentation. Module four is "Creating Student Publications". The activities are creating a publication, reflecting on the student publications, and revising the unit plan. The homework is creating evaluation tools for the publications. Module five is "Creating Unit Support Materials". This module helps with the use of Microsoft Word, Publisher, and Internet Explorer. Activities are creating unit support materials and revising unit plans. The homework is planning student web sites. Module six is "Creating Student Web Sites". The activities are the creation of web sites using publisher, reflecting on the web sites, and revising unit plans. The homework is the creation of web sites tools. Module seven is "Creating Teacher Support Materials". This module presents ideas for using e-mail as classroom projects. The activity is creating teacher support materials. The teachers could create a multimedia presentation, a web site or a publication to introduce or support the unit. The homework is revising the unit portfolio. Module eight is "Developing Plans for Implementation". Activity one is the development of a timeline for both when and how the events are going to happen before, during, and after the implementation of the unit. Activity two is creating management documents. These documents would assist the teachers with the logistics in the management of the equipment and the classroom. The homework is modifying the unit portfolio. Module nine is "Putting Unit Portfolio Together". Activity one in this module is revising completed units, and activity two is putting unit portfolios together. This module allows for final revision of all the components in the portfolio. There is a strong emphasis that all unit components to comply with copyright law. Homework one focuses on locating additional Internet resources for educators, and homework two is the completion of the unit portfolios. Module ten is "Showcasing the Unit Portfolios". The participants have the opportunity to show their products to each other. They receive feedback and suggestions. The participants evaluate the training and make suggestions not only for the implementation of the training but also in the way the binder is organized. The binder also includes a CD-ROM. This is a valuable tool that shows concrete samples of all the components in the binder. It also provides additional Internet links, and useful

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information to assist in the planning of the portfolio units. It is important to point out that during the training there was no need to look for any other additional materials. The CD-ROM and the Internet proved to be the ideal tools for this planning.

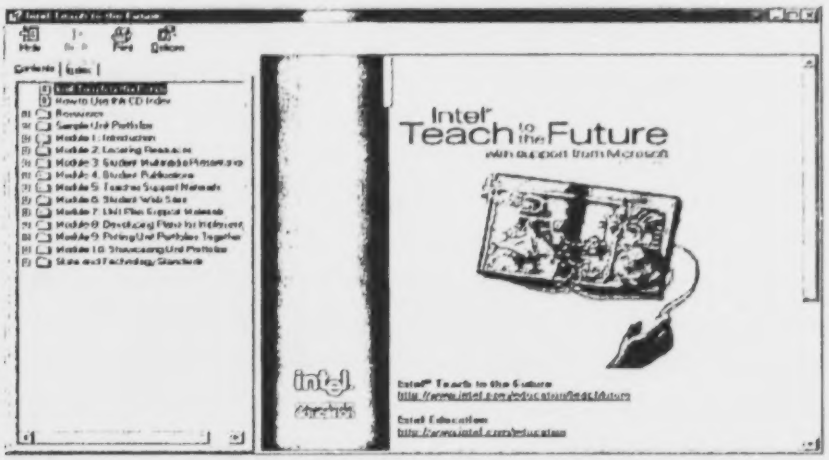

Figure 1: Intel Binder Table of Contents

Team Work to Implement the Modules

Faculty members at the Department of Urban Education, UHD see the Intel project as an initiative and source of ideas to incorporate technology into the teacher education courses. Extensive discussions among the faculty members have been done to divide the modules into several courses the students are going to take in different semesters, so that by the end of their studies they could cover all components. The nature of the Urban Education Program is very conducive to this teamwork. The programs in elementary, bilingual, and secondary run in blocks of three courses for each block The students have to complete three blocks to finish their degrees. The professors teaching the courses in a block have to do careful planning among the members of team. The students produce combined assignments. They receive the same grade in all the courses in a block. This dynamic interaction of the courses makes it possible to plan and deliver the Intel module in a more effective way. The students in the bilingual Block II for example focus on modules three, four, six, nine, and ten. These students are expected to have covered the rest of the modules in the ETC course. This is a technology class that all the students take before the blocks. The pre-service teachers as well as the PB seeking certification are also expected to have mastered several software programs such as Power Point, Excel, Publisher, and Words before entering the blocks.

The faculty teaching the blocks is constantly assessing the delivery of instruction. After the first implementation of the Intel Teach to the Future curriculum, there were some issues that needed to be addressed. For instance, the access to computer equipment was critical to the students. More than 90 % of the students enrolled in the courses did not own a computer. They depended on the university computer lab to complete their assignments. Since all the assignments had technology components, the students had to expend endless number of hours in the UHD lab and even had to miss work to complete the assignments. The department is fully aware of this situation. Therefore, as part of the Unit Plan the department is hoping to have a wireless lab dedicated exclusively to the Urban Education students. It is also exploring ways to assist the students in purchasing computers. As we move further into the technology age, the need to have a computer is becoming a necessity. However, until this problem is

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addressed, the number of assignments related to technology may be reviewed in the blocks as well as the re-distribution the Intel modules. The Urban Education Department will continue its emphasis in technology as long as the school districts want to hire teachers proficient in technology.

Students' Works and Electronic Portfolios

The students presented their electronic portfolio at the end of the summer semester 2001. This particular group of students is very unique. Some of the students were PB getting certification and were enrolled in the Master in Teaching program. They came to class for nine weeks. They were enrolled in Block II. They took Teaching Reading and Language Arts in Spanish, Curriculum in Bilingual/ESL, and Assessment. As part of the assignments for the block, this bilingual group of students focused on developing an interdisciplinary unit, a science project, an evaluation kit, and a case study. They were asked to include a multimedia presentation, a brochure or a newsletter, and a web site as part of the interdisciplinary unit for bilingual students. The students could choose a partner for the projects. They could also pick the grade level and the topic for the unit. All the objectives for the interdisciplinary unit had to be at the levels of analysis, synthesis, and evaluation. The students followed the guidelines from the Intel binder for their projects. Two weeks of class time was dedicated to work in the assignments. The students indicated that the binder was very helpful in the completion of their work. There were several products of a very high quality. The students felt that they had learned a great deal, but the work was very intensive. Some samples of their work follow.

Diana and Octavio's interdisciplinary unit was the Water Cycle. They used Microsoft Power Point to do the multimedia presentation of their science project. The presentation was about the formation of clouds.

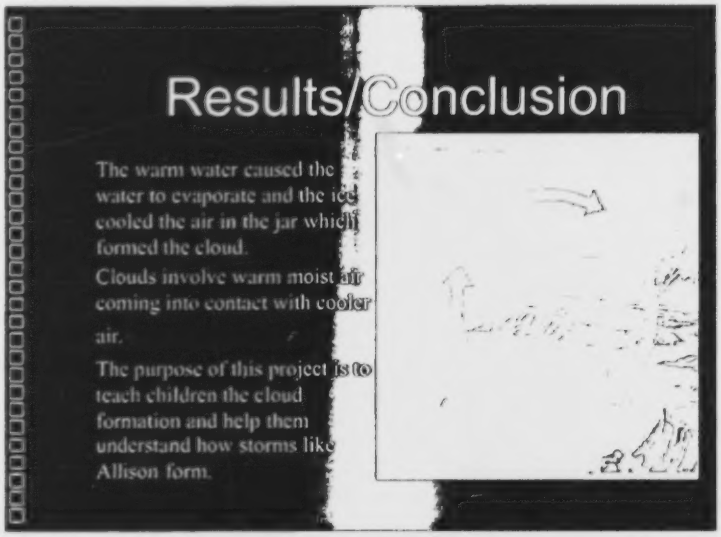
Results/Conclusion
The warm water caused the
water to evaporate and the ice
cooled the air in the jar which
formed the cloud.
Clouds involve warm moist air
coming into contact with cooler
air.
The purpose of this project is to
teach children the cloud
formation and help them
understand how storms like
Allison form.

Figure 2: Slide from Student PowerPoint Presentation

Ana and Rafael chose Earth Day for their interdisciplinary unit. Their unit was based on the following essential question: How can we as inhabitants of the planet Earth better the environment for the future? One of their activities was to produce the flier below.

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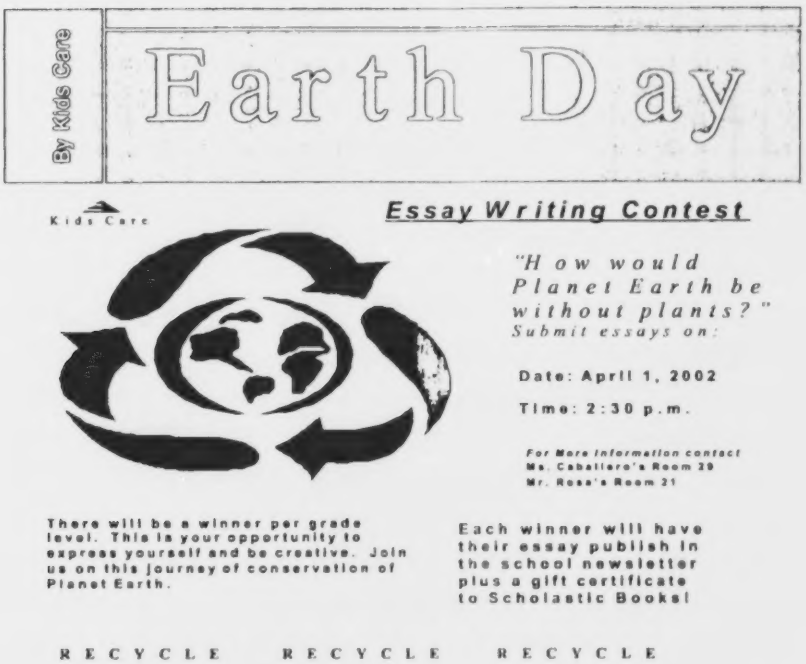
By Kids Care
Earth Day
Kids Care
Essay Writing Contest
"How would Planet Earth be without plants?"
Submit essays on:
Date: April 1, 2002
Time: 2:30 p.m.
For More Information contact
Ms. Caballero's Room 39
Mr. Rose's Room 21
There will be a winner per grade level. This is your opportunity to express yourself and be creative. Join us on this journey of conservation of Planet Earth.
Each winner will have their essay publish in the school newsletter plus a gift certificate to Scholastic Books!
RECYCLE RECYCLE RECYCLE

Figure 3: Flier from Student Presentation

Conclusion

In conclusion, we hope our experience will benefit other school districts and teacher education programs that are participants or are going to be participants in the Intel "Teach to the Future with Support from Microsoft" grant. Technology is a powerful tool for the twenty-first century. Universities and school districts will not be able to produce curriculum or students that are at the cutting edge unless they have the community and the business support. The support provided by the Intel grant allowed the University of Houston Downtown, Department of Urban Education to take one step ahead in the preparation of teachers with a strong component in technology. This support is greatly appreciated since our mission is to prepare teachers for inner-city schools. We hope other institutions will take advantage of this program sponsor by Intel. They will be hosting twenty-four training sessions around the country in 2002. The contact person is Cynthia Reed at Cynthia.d.reed@intel.com

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Creating Meaningful Learning Environment Using ICT

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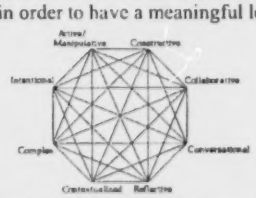
ABSTRACT
This article describes the process of creation of meaningful learning environment (MLE) following a three-dimensional process of activity-artifact-reflection cycle and recording the process of learning in the form of digital portfolios. Production of quality MLE and learning through MLE has been assured by following a method of feedback and evaluation, which consists of self-evaluation, peer-review and teacher-feedback in an integrated manner through various activities, e.g., online (synchronous and asynchronous) discussion, classroom group discussion and presentation; and feedback by the peer and the teacher. The present study is based on author's own practical experience of designing project-based activities. The activities are carried out using ICT and the students created digital portfolios during the course of their study. The learning takes place through individual learning and collaborative learning through interaction with the team members and the teacher.

What is Meaningful Learning?

In order to effectively integrate technology into a meaningful learning experience, we must have a clear understanding of what a meaningful learning experience is. Meaningful learning occurs when learners actively interpret their experience using internal, cognitive operations. Meaningful learning requires that teachers change their role from sage to guide. Since students learn from thinking about what they are doing, the teacher's role becomes one of stimulating and supporting activities that engage learners in thinking. Teachers must also be comfortable that this thinking may transcend their own insights. Meaningful learning requires knowledge to be constructed by the learner, not transmitted from the teacher to the student. (Jonassen, 1999). According to Jonassen et al. (1999), meaningful learning is:

- **Active (manipulative)**. We interact with the environment, manipulate the objects within it and observe the effects of our manipulations.
- **Constructive and reflective**. Activity is essential but insufficient for meaningful learning. We must reflect on the activity and our observations, and interpret them in order to have a meaningful learning experience.



Attributes of Meaningful Learning

- **Intentional**. Human behavior is naturally goal-directed. When students actively try to achieve a learning goal they have articulated, they think and learn more. Articulating their own learning goals and monitoring their progress are critical components for experiencing meaningful learning.
- **Authentic (complex and contextual)**. Thoughts and ideas rely on the contexts in which they occur in order to have meaning. Presenting facts that are stripped from their contextual clues divorces knowledge from reality. Learning is meaningful, better understood and more likely to transfer to new situations when it occurs by engaging with real-life, complex problems.
- **Cooperative (collaborative and conversational)**. We live, work and learn in communities, naturally seeking ideas and assistance from each other, and negotiating about problems and how to solve them. It is in this context that we learn there are numerous ways to view the world and a variety of solutions to most problems. Meaningful learning, therefore, requires conversations and group experiences.

To experience meaningful learning, students need to do much more than access or seek information. Moreover they need to now how to examine, perceive, interpret and experience information. In this course the student-teachers experienced the process of meaningful learning by progressing through various activities for creating meaningful learning environment (MLE) using ICT.

Steps in the Creation of MLE

In the introductory courses in Instructional Technology for Teacher Education Programme the trainee teachers were assigned to create MLE by considering all the attributes of meaningful learning as described above. The student-teachers worked in groups particularly in pairs.

Developing an Idea Map using Mind mapping Tools

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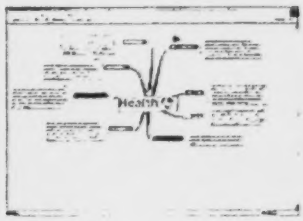
Student-teacher decided on a topic and did brainstorming on how to include various attributes of meaningful learning in the creation of a learning environment for their students. The student-teacher then represented their ideas in a visual format using the "mind mapping tools" (http://www.mindjet.com).

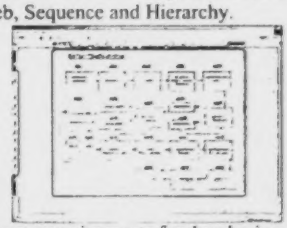


Another two groups of student-teacher (i.e., two pairs) then reviewed each of these Idea Maps. The feedback was provided to the creators online using the "discussion forum" "Blackboard" delivery platform (http://www.blackboard.com). Based on the feedback received through peer-review the student-teacher then made changes and modifications. Also student-teacher wrote their reflection on how they have found these set of activities useful.

Creating the Flowchart of Activities

Cognitive psychologists have known for decades that most people can only hold about four to seven discrete chunks of information in short-term memory. The goal of most organizational schemes is to keep the number of local variables the reader must keep in short-term memory to a minimum, using combination of graphic design and layout conventions along with editorial division of information into discrete units. The way people seek out and use information also suggests that smaller, discrete units of information are more functional and easier to navigate through than long, undifferentiated units.

Student-teacher then involved in sequencing the activities where they have used the flowcharting techniques. They were introduced to various types of flowcharting such as Grid, Web, Sequence and Hierarchy.



Trainees selected the structure according to their own requirements for developing a student-centered learning environment. Trainees followed four basic steps in organizing the information and activities. These are: to divide the content into logical units, establish a hierarchy of importance and generality, use the hierarchy to structure relationships among chunks, and then analyze the functional and aesthetic success of the complete system. After sequencing the activities the trainees started working towards the detail design of individual screen for display in the form of storyboard.

Designing the Storyboard

Storyboards are a visual representation of what an interface (CBT, Web, Movie, Book, etc) is supposed to look like. It is a sketch. Three key items were considered by the student-teachers when drafting the storyboards:

Navigation - What and where will it appear on each page? What technology will be used to implement it?

Identification Info - Each page needs some type of identification information such as (title, menu link, home link, etc) and

Content - What should be visible on a particular page?

Before creating the storyboard the trainees learnt the techniques and strategies of searching information on the Internet. They also learnt about evaluating the resources. They searched information relevant to the chosen topic for MLE.

Developing the Meaningful Learning Environment

Student-teachers finally used the MS Powerpoint application software for developing the MLE. Trainees concentrated on three aspects for creating MLE: Context (creating a real-life, complex and authentic scenario), Activities (designing activities for collaboration, sharing, decision-making and knowledge construction) and Tools (providing tools for searching, thinking, reflection and creativity). Student-teachers learnt and used the advanced features of the MS Powerpoint software. They also concentrated on media selection for maximizing the learning effectiveness. . Student-teachers' also made the workstation presentation of their final artifact of this project, the MLE. Peer-evaluation was conducted for feedback for making modification and changes before final submission.

Integration of ICT in Education

Trainees learnt to use different learning technologies during the process of working towards the final product of MLE. The process of completion of this project through a set of learning activities of designing and developing artifacts, taking part in online (synchronous and asynchronous) discussions, reflecting on various tasks were represented in the form of a learning portfolio on the web. The

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evaluation was done using different rubrics for different activities. A rubric for the evaluation of student-teachers' reflections on various activities was also created (Bhattacharya, 2001).

The integration and link among the different activities performed by the students in a course is very crucial for understanding the connection and integration of in this process students can visualize the learning as a whole and not as bits and pieces of task to complete (Bhattacharya and Richards, 2001). The author's purpose for introducing of eportfolio is to assist students to better understand and be able to articulate their learning as they developed their personal professional knowledge and skills about IT in education. The electronic portfolios show a more complete picture of student progress and achievement than traditional approaches to assessment. Students can demonstrate a variety of competencies, take greater responsibility, and became skilled at self-evaluation by developing electronic portfolios.

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Electronic Portfolios in Pre-service Education– Distinguishing Between Process and Product

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Abstract: This paper explores the use of electronic portfolios in the Faculty of Education, University of Wollongong, from 1997-2001, through the lens of ICT integration. Three subject cases are described noting the purpose of the portfolio, the degree of infrastructure support, the lessons learned and the issues that are informing our future program-level decisions. Electronic portfolios are not a uniform entity or a magic solution. Hartnell-Young and Morriss (1999) describe three types – formative (developmental), summative (assessment) and marketing. These translate simply into either a process emphasis (long term, foundational and iterative) or a product emphasis (short term, polished and highly audience specific). Students developing electronic portfolios require sound information management skills to support a sustained process, and clear understanding of target audience and assessment criteria for individual products. Without faculty level support via infrastructure and course level planning the true benefits of a process/product balance will not be realized.

Introduction

Lifelong learning, reflective practice, professional development and integration of ICT (information and communication technology) can all be addressed in pre-service teacher education through the use of electronic portfolios. Students have to demonstrate their technical, creative, organizational and reflective abilities to varying degrees, enabling them to explore multiple forms of expression and develop information literacy skills to equip them for greater use of electronic information sources. Lecturers gain the experience of handling bulk electronic material, dealing with issues such as collection, collation and distribution for marking, debating on-screen versus print format for reading, and determining various mechanisms for effective student feedback (Brown 1998). But electronic portfolios are not a uniform entity or a magic solution. They can be used inappropriately, or used to the exclusion of simple and practical alternatives. This paper explores the evolution of their use in the Faculty of Education, University of Wollongong, Australia over the period 1997-2001, through the lens of ICT integration.

Doctoral studies (Brown 1997) identified new activities for the teacher and learner in a constructivist classroom environment. The teacher is a process facilitator, a designer of tasks or cognitive tools, a resource organizer and a source of metacognitive support (strategy sharing, modeling and apprenticing learners as problem solvers). The learner is a producer of resources who needs to learn to organize those resources, share strategies, and work collaboratively and cooperatively with fellow learners. Collectively, the reciprocal actions of teacher and student are at various times active, reflective, individual, collaborative, cooperative, creative, expressive and most important of all – flexible. The background was there for the emergence of electronic portfolios.

Three subject cases are discussed (Tab.1) to illustrate a shift from subject to program-level thinking that now influences the purpose of each portfolio activity. Hartnell-Young & Morriss (1999) describe three types of electronic portfolio – formative (developmental), summative (assessment) and marketing. These translate simply into either a process emphasis (long term, foundational and iterative) or a product emphasis (short term, polished and highly audience specific). Each subject case is explored in relation to the purpose of the portfolio, the degree of support and infrastructure required, the lessons learned, and the issues that are informing our future program-level decisions.

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Class Examples	1999	2000	2001
Example A. Undergraduate Multimedia Electives (Primary Program 3-4 yrs)	Formative portfolio – reflective, skill development with different ICT multimedia tools *Other tasks*: web site, HyperStudio activity and essay.	Summative portfolio – assessment of skills; teaching strategies to support group project *Other tasks*: group project and resource database or concept map/essay.	Marketing portfolio– geared to employer for interview; drawing on past subjects. *Other tasks*: client profile, design statement and group project for client.
Example B. Compulsory ICT Subject in first year (Primary Program 3-4 yrs)	No portfolio *Tasks*: Exam, assignments, skill tests)	Formative – skill development aligned to roles (learner, manager, designer, researcher) (14 options) *Other tasks:* online discussion for exam preparation and skill tests.	Formative – skill development aligned to roles - options based on 2000 cohort choices. (8 options) *Other tasks:* pedagogical application of skills, software demonstration and online discussion analysis.
Example C. Compulsory ICT component of Pedagogy (GDE Program 1 yr)	No portfolio *Tasks:* Exam, skill tests, assignment)	No portfolio *Tasks:* Exam, skill tests, assignment)	Summative – Report, Formative - teaching resources, activities and student work *Other tasks:* pedagogical application of skills and online discussion analysis.

Table 1: Focus of electronic portfolios and nature of accompanying assessment tasks in three class examples for 1999, 2000 and 20001.

Example A: Undergraduate multimedia elective

The undergraduate multimedia electives provided the test-bed for electronic portfolios within the faculty and it was the success of the first student electronic reflective "portfolio" in 1999 that drove a desire to adapt it for subsequent groups in different programs. From 1997 two multimedia electives were available for students in the fourth year of the primary (elementary) program – students who had barely touched a computer since a compulsory introductory ICT subject in first year. Electives were run as weekly three-hour workshops that aimed to help students develop technological fluency and problem-solving skills as they used a range of cognitive tools and experienced multimedia construction to support learning. Through 1997-1998 the lecturer was responsible for collating and archiving all assignment work so students could

obtain a CD-ROM of the class collection of resources for teaching. By 1999, influenced by cognitive flexibility theory (Spiro, Feltovich, Jacobsen & Coulson 1991) that suggests you "criss-cross the landscape" to gain understanding of complex or ill-structured knowledge domains (in this case multimedia construction), activities were designed to "flip" students from one multimedia construction tool and task to another. They were then asked to: "Create a portfolio to demonstrate what you have learned in this subject, and illustrate your skills in information technology. You should link to your web site, describe your HyperStudio project, list strategies for classroom use of the web site and HyperStudio stack, and also present a collection of web sites you have identified as useful resource collections or sites for student use." Many were shocked by how quickly they forgot the mechanics of web site construction, as they proudly finalized their HyperStudio projects. Tools impacted on the way they processed information, but tools were evolving, so students had to move beyond reliance on a particular product to a deeper awareness of general principles of multimedia construction.

The purpose of this portfolio was to prompt students to reflect on what they had learned, demonstrate their skill development, relate their projects to classroom application and archive their work for the subject. Course structures evolve, and by 2000, these two electives were replaced by a flow of four more specialized electives that either emphasized one style of construction tool (such as web authoring or card-based multimedia presentation) or an aspect of production such as resource management or working with a "real" client. The portfolio task was retained as the final activity in each subject, and its purpose was re-oriented towards assessment, with a heavy emphasis on more specific and in-depth skill demonstration to do with a range of resource production tools. In 2001, within the final elective of the sequence, students were targeting future employers as the audience for their electronic portfolio. A number were accessed within job interviews with positive outcomes.

The infrastructure for these workshop mode classes has been rich, with plentiful access to hardware and software that has enabled students to engage in sustained media construction in a collaborative fashion. Careful group selection, peer tutoring and access to technical support can maximize the learning gains from group diversity and use of technology.

The key lessons learned from the evolution of electronic portfolios in these multimedia electives are their highly motivating nature when you allow some flexibility (such as choice of tool for construction), balanced by a need to clearly articulate the purpose, the target audience and the scope. The first element calls for early negotiation of assessment criteria; the second and third elements can be supported by access to past examples of a broad range of student work. Repetition of an activity within a flow of subjects diminishes student concern regarding the nature of the activity and allows them to focus more on the quality and depth of content.

Issues that inform future directions include the need to maintain these summative electronic "products" in an ongoing archive for subsequent deconstruction, adaptation or inclusion in the final marketing portfolio.

Example B: Compulsory first year IT subject in a 3-4 year program

The core compulsory ICT subject within the three-year primary degree has been designed to embed ICT functionally within the life of a teacher, based around four teacher roles – learner, manager, designer and researcher (Brown 2002). Since 2000, this framework has been made explicit as a required electronic folder structure that is to house a collection of tasks the students choose from a set of options. Fourteen options were offered in 2000, and the number was reduced to eight in 2001, based on the popular choices from the previous year.

The purpose of this portfolio is formative, even though it represents a collection of discrete "products". Students are required to create a collection of folders as one potential structure for an ongoing archive of the electronic documents they generate from university and classroom activities. The aim is to equip students with the skills to organize and manage a collection of files. The hope is that they will maintain the habit throughout their course. Earlier activities in the subject ensure students develop some familiarity with database, web site and card-based multimedia construction tools. They get the opportunity to extend these skills through a range of the portfolio activities that are richer tasks. It is always delightful to see the ease with which students hop from one application to another after they have re-visited tools and processes a number of times in self-determined, peer or tutorial-driven sequences.

The infrastructure required for weekly one-hour tutorials is laboratory access with adequate hardware and core software tools. Presentation facilities are vital for *student* presentations, and tutorials

allow tutors and fourth year demonstrators to model a vast array of teaching strategies in a laboratory environment. A substantial team of lecturers, tutors and demonstrators are available for student support. Flexible attendance (ability to attend *extra* tutorials) caters for students who need additional help and reduces the stress associated with assignment submission that is constrained largely to tutorial time.

The key lessons learned from this experience are associated with portfolio assignment submission. Many students have little faith in electronic submission and wish to give you wads of paper "just in case". The "teachable moment" lies at the point of submission, and if your attitude is supportive and you help students correct obvious problems or take the time to demonstrate that their files are functional, this can be the most productive moment for the student in the subject. One person needs to coordinate assignment collection and this means a very heavy week for that person. The paper trail that accompanies submission requires students to self-assess their work and allows them to comment on any extenuating circumstances related to equity. It remains vital evidence of receipt of electronic material.

Issues that inform future directions include the need to apprentice other staff to the key coordination role that is crucial as a model for students and faculty, faculty wide awareness of student capabilities so newly acquired skills can be re-visited and refined through options offered in other subjects, adequate technical infrastructure so students can maintain their momentum in a self-regulated way, and faculty level consideration of a the value of a product oriented portfolio at the end of the course that builds on the process this subject initiates.

Example C: Lecture and tutorial series in an annual subject and degree

The Graduate Diploma of Education is a one-year course currently composed of both annual and semester-long subjects. ICT integration is formally addressed in a six-week slice of the annual subject "Pedagogy" early in the year, and informally continues throughout the year. This allows the portfolio activity to feature a seven-week school practicum mid-year. Although the four teacher roles described in Example B are discussed in the lecture series, they are adapted to suit the availability of schools, and re-organized to mirror the teaching cycle. Students first *research* their school ICT environment, *design* activities with their supervising teacher, *manage* those activities and *evaluate* what they have learned. A structured report stitches the experience together, accompanied by electronic folders containing resources, activities and student work. Submission protocol mirrors that for Example B.

The purpose of this portfolio is both formative and summative. The formative nature is anchored to the folder organization and the request for students to collect all available resources and target student work. Unless they have evidence of what the students achieved, they cannot make a meaningful self-assessment of their performance or the value of the ICT they used. The report is the summative component that is assessed as a product.

The infrastructure required for six weeks of one-hour tutorials is laboratory access with adequate hardware and core software tools. Presentation facilities are vital for *tutor and demonstrator* presentations, given the short time frame. Two lecturers and demonstrators manage the group. Flexible attendance (ability to attend *extra* tutorials) is offered to support those in need, and additional tutorials are programmed throughout the year to allow for staggered assignment submission and support.

The key lessons learned from this experience relate to the staggered nature of the "subject" and the ability to focus ICT use on a school practicum. Although students "switch off" to the tasks when the lecture series is complete, the break leads to a more realistic self-appraisal of what they initially learned. The school-driven agenda that emerges from the practicum ensures that students have many rich and unique experiences to share on their discussion forum for later review and analysis.

Issues that inform future directions include the impact of staggered student-driven access to facilities on timetabling and staffing, and the need for more meaningful links with the supervising teachers in schools.

Discussion

Electronic portfolio construction has emerged from an intensive workshop environment with localized infrastructure (Example A) and is occurring in a more student-driven environment without routine laboratory contact (Example C). There is no doubt students engaged in electronic portfolio construction in Example A have the opportunity to utilize the power of electronic composition environments. For students

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in Examples B & C, faculty wide support is required to capitalize on the benefits of these subject-based experiences. Jonassen (1998) attributes the failure of many projects to poor implementation because the designers or technology innovators " failed to accommodate environmental and contextual factors affecting implementation. Frequently they tried to implement their innovation without considering important physical, organizational, and cultural aspects of the environment into which the innovation was implemented." Good ideas can be foiled by lack of attention to the day to day practical details. To gain value from Examples B & C, the faculty needs to support the idea by addressing three key issues– infrastructure, staff professional development and curriculum leadership.

Infrastructure encompasses hardware and software (sufficient lab access for regular student use), technical support (relative to student needs, rather than simply hardware focused), storage space (for ongoing student storage of their work archive) and backup facilities (particularly for staff) to ensure some degree of student use equity. Staff professional development is needed for electronic assignment collection techniques if they are to understand how ICT can change classroom management. Alternately, there should be a system developed for collection of electronic material across the faculty, possibly staffed by fourth year students for whom the experience would be highly relevant to school protocol. Professional development should also embraces staff links with teachers who are supervising our students. Curriculum leadership is necessary to consider flexible timetables and team teaching where deadlines are staggered. It is also a program level curriculum decision to adopt electronic portfolios.

If the faculty were willing, then I would make a series of recommendations. Begin with a process approach that emphasizes file management associated with electronic archive production. Students need to develop their own mental model of how they wish to organize their work. Providing an initial top-level folder structure can support student management of electronic documents and help them keep track of their electronic work. Support staff professional development if the process approach is applied to an electronic collection of student work throughout the program. Individual lecturers can be involved as little or as much as they feel comfortable. Many lecturers don't think outside the scope of their subject, but student access to archival material permits them to stitch ideas together, re-visit theoretical material and annotate it with class examples, and juxtapose different theoretical models to rationalize differences. Balance the process approach with product focused portfolios that help students refine reflection and presentation skills. Complete the program with a marketing portfolio geared to employers, that pushes students back through their course material to illustrate what they have learned.

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The Intimacies of Electronic Portfolios: Confronting Preservice Teachers' Personal Revelation Dilemma

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Abstract: This paper presents findings from a qualitative study of six preservice teacher portfolios—three web-based and three traditional paper format. Using a sociocultural frame, the researcher considered how the tool chosen for authoring afforded and constrained the writer in representing and communicating teacher knowledge. These six cases of portfolios done by secondary certification candidates in a Masters in Teaching program reveal a tool-related personal revelation dilemma. Teacher education programs ought to be aware of this dilemma and take measures to ameliorate preservice teachers' concerns about exposing problems of practice to potentially critical portfolio readers.

Introduction

Portfolios have become common practice in teacher education programs around the country (Georgi & Crowe, 1998). Colleges of education have incorporated them for a variety of reasons: to prompt reflection, to provide a record of professional development, to demonstrate achievement of program goals, to encourage professional discourse, and to give students a portable artifact for job interviews. Underlying these uses is a common assumption: that a portfolio is a good device for representing teacher knowledge. Indeed, portfolios' numerous proponents are able to cite strong theoretical support for the use of portfolios to document, assess, and develop teacher knowledge (Wolf, Whinery, & Hagerty, 1995).

Though the vast majority of teacher portfolios are currently traditional print text, preservice and inservice teachers increasingly are being encouraged to use hypermedia and web technology. Colleges of education, under pressure to incorporate additional technology into teacher preparation programs, often see electronic portfolios as a way to develop preservice teachers' computer competencies (Levin, 1995; McKinney, 1998) and solve many of the logistical problems associated with portfolio storage, ownership, and access (Georgi & Crowe, 1998).

The rapid movement toward all forms of web-based communication makes it likely that, in the future, this particular electronic medium will play an important role in the communication of teacher knowledge. However, we know very little about the implications of using the web for teacher portfolios. In using new technologies for the portfolio, the assumption seems to be that we can substitute one medium for another—keeping the benefits of traditional print formats while adding a host of new conveniences. Our past experiences with innovative technologies would suggest one technology cannot be so easily swapped for another. The introduction of a new tool into human activity often changes that activity in ways unanticipated and sometimes profound (Wertsch, 1995). All tools have particular affordances and constraints—that is, they make certain actions easy to carry out, and others difficult (Gibson, 1979). In analyzing or planning for tool-mediated action, we need to consider how such a device shapes an activity by limiting some of our potential actions with it, while it facilitates others. How will the distinctive affordances and constraints of web technology transform teacher portfolios? Does hypermedia offer teachers new ways to conceptualize and represent their teaching practice? How can we best use electronic portfolios for teacher learning and professional development?

My study suggests some answers to these questions. I will report here on findings related to a personal-revelation dilemma faced, to some extent, by all teachers who author portfolios, but especially preservice teachers. My finding suggest that the use of web technology for portfolio authoring may impose some special constraints on these preservice teachers .

The Study

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Case studies of six preservice teacher portfolios were developed in an effort to understand how electronic and traditional portfolios help preservice teachers conceptualize themselves as teachers, represent their knowledge, and communicate it to others. This study used a sociocultural frame to consider how the tool chosen for portfolio authoring interacts with other artifacts in the setting to influence conceptions of portfolio audience, purpose, form, and content. The cases included both a paper and an electronic portfolio from three different secondary subject areas: language arts, social studies, and science (physics). Study participants were in the final quarter of a Masters in Teaching program at a large research university. Data was collected by means of think-aloud commentaries, participant interview, examination of the Teacher Education Program (TEP) guidelines and rubrics for portfolio construction, as well as careful analysis of participants' completed portfolios.

Findings

One finding of my study is that the act of authoring portfolios is a highly personal process for preservice teachers; five of the six participants expressed strong concerns about revealing their deeply-felt motivations for teaching and their most intense student teaching experiences. "This whole process feels so intimate," confided Hannah, a novice social studies teacher and traditional portfolio author.

Doris, another traditional portfolio author, explained her worries and how they caused her to limit personal revelations in her portfolio: "I didn't reveal a lot about, you know, my failures, and I know that, that was part of the process, we were asked to make...but I did not go into any kind of emotional depth in my portfolio. And I could have, but I just, I didn't feel like I could trust it. I just couldn't trust it. (D-I, p. 11).

In contemplating personal revelations, participants who authored traditional portfolios seemed most concerned about prospective employers who might later be readers. The participants who posted their portfolios on the web, on the other hand, worried not only about an audience of school administrators, but also about other unknown, potentially critical readers who might be part of a vast audience on the Internet. Unlike traditional portfolio authors, who could at least decide who had access to their finished portfolio, those who posted their portfolios on the web gave up that control.

Two of the three electronic portfolio authors communicated strong concerns about revealing personal information or speaking candidly about the problems they might have faced during student teaching. Both indicated they had left important things out of their portfolios as a result of these concerns. Maggie, a language arts electronic portfolio author, spoke of her unwillingness to reveal mistakes in her portfolio because she felt this would be like "advertising" herself as a finished product to an imaginary person on the web:

> It's not like I'm afraid to say, I made a mistake here, and this is what I would do differently; there are just like different levels of mistakes, you know there are some that are so fresh and awful...you don't just open those up to people who might not treat that wound kindly...I probably wouldn't do a portfolio in the future on the web, because it's just a spot where I am now, it's not, and I'll be changing from that spot, and I wouldn't want...I guess I'm just really hypersensitive to some imaginary person thinking that I think that where I am now is good enough, that I think that where this portfolio is right now is, shows the best teaching that I can ever do. That's something I really don't like about publishing it on the web, you know...like advertising this is who I am. And because, I guess I feel very fetus-like still (M-I, p. 5,7).

Mark, a preservice social studies teacher and electronic portfolio author, also grappled with this issue of personal revelation. It was a particularly troublesome dilemma for him because it involved the possible revelation of his sexual orientation. Mark would have liked to include artifacts in his portfolio that dealt with issues he faced as a teacher who is also a gay man, but felt he was unable to do so.

> I really would have liked to have included more about issues that I have as a gay teacher. In particular, dealing with homophobia among my students and the different issues I had dealing with that. I would like to have had an artifact where I talked about how I dealt

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> with that and why it was different for me than if I were a straight man dealing with it. And how it kind of made it even more of a challenge for me, and how I felt, not only did I feel that I couldn't be out, but the vice principal even told me I could not and that, I just would have really liked to have talked about some of these issues and about how I was in a school where supposedly diversity is treasured on the one hand, but on the other hand, when actually faced with having to deal with diversity, they don't want to deal with it (Mk-I, p. 9).

Although Mark had been open about his identity as a gay man among colleagues in his Teacher Education Program (TEP), and he was "out" among the faculty where he student-taught, he was warned by the assistant principal at the school not to disclose his sexual orientation to students. Mark acquiesced because he was afraid that being fully out might make it difficult for him to get a job. For this reason, he avoided including artifacts in his portfolio that explicitly identified him as gay. He said he could only present these issues in indirect ways in the portfolio—for example, by including a drama script that showed students dealing with homophobia in their school, and in his classroom management plan, where he discussed how he would deal with gender issues and homophobia in the classroom. But these artifacts were not sufficient for Mark to feel that he had faithfully represented himself as a teacher. He said sadly, "So that whole aspect came out in those two ways in a very limited sense, but as far as being able to include that part of myself, I definitely feel like there's a hollow kind of space where this portfolio doesn't represent me fully" (Mk-I, p. 10)

I found it interesting that Mark produced a CD version of his portfolio that differed from the one he posted on the web in one significant way. The dedication page of his CD portfolio has one phrase the web portfolio does not: "[I thank] my partner, Brett (pseudonym) for his loving support." In the web version Mark thanks his "family."

The third electronic portfolio author in my study, a physics teacher whom I referred to as "Kyle," did not speak of worries about personal revelation in his web portfolio. However, this does not mean that Kyle was not concerned about revealing problems he encountered during student teaching. It seems to be due, instead, to the narrow audience and purpose he defined for his portfolio. Unlike the other participants in my study, who attempted to achieve multiple purposes in their portfolios (i.e., seeking to demonstrate reflective thinking and the achievement of program goals for TEP readers at the same time they produced a product suitable for job interviews), Kyle designed his portfolio for the prospective employer and trusted that it would, in the process, also meet university requirements. As he explained it: "I tried to think of it more in terms of the 'gettinajobedness' of it, and then I figured the 'gettinajobedness' of it would end up meeting the university requirements (K-I, p. 7).

As a result of this focus on a single reading audience—the K-12 administrator—Kyle experienced fewer tensions than the other authors, who attempted to achieve multiple purposes and meet the needs of diverse readers. However, Kyle's definition of the prospective employer as primary audience, had an unfortunate effect: his portfolio contained only four incidents of what I termed *critical self-exposure* (remarks exposing inadequacies in one's teaching practice). He speaks of just two problems he experienced during student teaching: managing a classroom so as to minimize behavior issues and preparing students adequately for somewhat unstructured lessons. Kyle's discussion of these issues is unusual in that he ascribes all his weaknesses to a lack of on-the-job experience. His statements are very much in accord with the prevailing belief in schools that one only learns how to teach in the classroom. The kind of theoretical knowledge universities value is portrayed as inadequate. In taking this stance, Kyle is displaying a strong awareness of audience and has clearly adapted his message his audience's beliefs and prejudices.

What is the significance of Kyle's lack of critical self-exposure in his portfolio? I would consider a portfolio author's willingness to engage in *critical self-exposure* to be a necessary condition for reflective thinking about one's practice (Zeichner & Liston, 1995). The preservice teachers in my study avoided critical self-exposure. Table 1 below shows the incidence of such comments in the portfolios:

Table 1: Incidence of Critical Exposure in Preservice Portfolios

	Language Arts	Social Studies	Physics
	Doris	Hannah	Roger
Traditional	3 suggested modifications in instructional method	3 suggested modifications in instructional method	10 suggested modifications in instructional method
	Maggie	Mark	Kyle

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Electronic	1 suggested modification in instructional method	3 suggested modifications in instructional method; 8 in classroom management	4 suggested modifications in classroom management

Considering that these portfolios contained eight to ten artifacts, each with an attached entry slip in which the author was to engage in reflective thinking, these preservice teachers identified few troubling puzzles of practice. (Author's note: Although Mark, an electronic portfolio author, has engaged in more critical self-exposure than the other participants, most of his comments are found in a paper he had written previously for a university class, and included as an artifact to demonstrate his capacity to use research sources. He indicated to me that he felt safe in including it because he didn't think any prospective employers would plow through its dense academic prose.)

What does this paucity of critical exposure mean for teacher education programs that mandate portfolios for their preservice teachers? How does the use of electronic portfolio authoring tools and publication on the web influence the manner in which preservice teachers represent themselves and use portfolios as devices for reflecting on problems of practice? I will discuss these issues in the following section of this paper.

Conclusions

My study suggests preservice portfolio authors are very concerned about how the reader will perceive them—especially if that reader is a prospective employer or someone unknown. As a result, they will tend to avoid talking about aspects of self or student teaching that might be viewed negatively. Their personal revelation concerns caused them to avoid the kind of critical self-exposure necessary for truly engaging with problems of practice. If portfolios do not provide a place for such reflective thinking, it doesn't seem likely that they will result in the kind of improvements in teaching practice or continuing teacher knowledge development that advocates hope for.

Electronic portfolio authors seemed particularly worried about potentially critical readers. Publishing on the web offers these portfolio authors the great affordance of being able to communicate with a wide audience, anywhere in the world. This affordance could actually be a constraint for preservice teachers, however. Insecure in their knowledge of a new profession, they are reticent about revealing to unknown readers out there on the web how they struggle with problems of practice—their "wounds," as Maggie called them.

These findings suggest a personal revelation dilemma for teacher education programs that encourage their preservice teachers to post portfolios on the web. The technology that affords teachers the opportunity to share teaching knowledge widely may prove too revealing for novices to deal candidly with problems of practice. And in establishing a situation that inhibits preservice portfolio authors from dealing honestly with the difficulties they experience in student teaching, we may inadvertently contribute to the current culture of isolation in the profession. Imbued with idea that mistakes ought to be hidden, teachers are forced to construct their knowledge of practice privately rather than in a community of practitioners.

Yet web portfolios have great potential for developing teacher knowledge, and we ought not reject them out of hand. Knowledge is developed in a profession as practitioners talk about problems of practice with others in their professional community. Teachers have traditionally lacked the tools and venues for communicating their professional knowledge. Web technology may enables us to establish that discourse online. Wineburg (1997) saw portfolios as opportunities for social learning—web portfolios may extend that social learning beyond the confines of the local setting. To do so we may need to solve the personal-revelation dilemma.

I suggest one structural and two technological solutions to this personal-revelation dilemma. First, we ought to distinguish between *showcase* and *growth* portfolios. A *showcase* portfolio is one designed to show off the successes of one's practice for potential employers and interested strangers. A teacher's "growth" portfolio—with its personal revelations and deep reflection on problems of practice—is more appropriately shared only with those whom one knows would be supportive. If we post portfolios directly on the web, this study suggests they should be showcase versions.

One technological solution to the personal-revelation dilemma may be to create password-protected environments for small communities of teaching practice. Efforts like the University of North Carolina's Lighthouse project (DeWert, Jones, & Carboni, 1999) give us some ideas about how we might

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establish a setting where novice teachers can talk about problems of practice with cohort peers and supportive university and school teacher mentors.

A second technological solution to the personal revelation dilemma would be to produce the complete portfolio on CD, uploading only a showcase version to a web server. Authoring one's portfolio for CD presentation allows the teacher to better control who will read it. Perhaps several different CD portfolios could be produced, each designed for a different reading audience or to accomplish different purposes. The ease with which one could adapt a full growth portfolio for various audiences would provide a great advantage over portfolios done with traditional media, which don't readily lend themselves to being reassembled multiple times in different ways.

As new technological tools are developed, we need to carefully consider how they might be used to further our goal of developing the professional knowledge of teachers. New web technologies offer us many new affordances that ought to capitalized upon. Conversely, the constraints of electronic portfolio tools ought to be recognized and, if possible, ameliorated through careful portfolio design. This paper suggests some possible solutions to the personal-revelation dilemma experienced most acutely by preservice teacher s who author portfolios on the web.

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Web-Based Electronic Portfolios: A Systemic Approach

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Abstract: The College of Education at the University of Nebraska at Omaha has been developing a digital portfolio for pre-service teaching candidates. This portfolio is database-driven and can be accessed by teacher candidates through a web browser. This portfolio has been developed to be systemic, covering all of the candidate's courses. The teacher candidate has the ability to include artifacts from any of their coursework. Pre-service teaching candidates can review and reflect on work from previous course work for inclusion in their summative portfolio. This process has also enhanced communication between candidate and faculty as well improved the learning process.

Introduction

The use of portfolios for pre-service teacher candidate assessment has been emerging as a trend to be considered when planning for candidate assessment. Portfolio assessment allows teacher candidates to collect, select and reflect on artifacts that allow them to demonstrate teaching competencies and standards. The use of technology in the portfolio development process greatly enhances this process. Rather than storing bulky notebooks or boxes of artifacts, teacher candidates can create and present their portfolios in an electronic format. Rather than flat files, electronic portfolios allow for interactive demonstrations of teacher candidate competence. Multimedia artifacts can be included in the portfolio. Candidates can add digital video, audio, still digital images as well as interactive application presentations created in software such as PowerPoint and Hyperstudio. Text-based reflections and observations of peers and other evaluators can be added to the portfolio as well. The sum of these parts presents a much richer picture of the teacher candidate's abilities than a traditional assessment.

The use of the Internet in the portfolio development process increases the candidate's ability to effectively create and use their teaching portfolio. This process also allows the them greater flexibility in the portfolio development and reflection process. The use of the web browsers to interface with the digital portfolio provides the opportunity to for candidates to work asynchronously from any place that they have access to a computer with a web browser. It also allows evaluators to view and provide feedback to candidates with the same flexibility. Combining the use of databases and interactive web pages also amplifies the effectiveness of digital portfolios. Traditional paper portfolios can be cumbersome to review and assess, especially in universities that have large numbers of teacher candidates. Digital portfolios that are web and database driven can increase the communication between candidate and faculty. These portfolios have the capability to generate email as a communication tool as well provide rapid feedback in the portfolio

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development process that at times is missing in traditional portfolios. In addition to providing an avenue for the candidate to reflect on their work, the digital portfolio can be electronically modified to accommodate a variety of audiences and purposes such as college administration, performance exhibitions, or potential employers. The web-based digital portfolio also allows for a more systemic assessment of candidate performance. This portfolio permits candidates to reflect on their growth over a long period of time and across courses while giving them a much clearer picture of how their coursework and field placement activities are inter-related.

The University of Nebraska at Omaha (UNO) has undertaken the development and implementation of a systemic, web-based, database-driven teaching portfolio for pre-service teaching candidates. UNO's digital portfolio has been under construction since November of 2000 and has been used by over 400 pre-service teaching candidates. This portfolio process is currently a work in progress. The digital portfolio changes as more discoveries are made about the capabilities of this process. The digital portfolio was developed as a result of a Preparing Tomorrow's Teachers to Use Technology (PT3) grant, a need to more effectively assess pre-service teacher candidates and a need to meet NCATE standards for accreditation. UNO's digital portfolio serves a variety of purposes. First, it provides candidates with the traditional portfolio advantages. It allows them to collect, select and reflect on artifacts in their portfolio. Since it is web-based candidates can present their portfolio to a variety of audiences. The portfolio has a mechanism to demonstrate both INTASC teaching standards and ISTE technology teacher standards as part of a summative portfolio. As the candidates progress through their undergraduate careers, the portfolio gives them an electronic area in which they can collect artifacts that they may want to use for their summative portfolio. The digital portfolio gives them the opportunity to select specific artifacts that will be used to demonstrate the teaching standards. Since the portfolio is database driven it also allows the artifacts that candidates have in their portfolio to be customized for different audiences.

The portfolio is both formative and summative. PT3 staff work with course instructors to develop a series of activities that become artifacts for the formative portfolio. In many cases these artifacts were originally artifacts that teacher candidates were required to include in paper portfolios. The formative portfolio is a work in progress. This area may include many different types and qualities of a teacher candidate's work. These artifacts serve as the basis of the candidate's formative portfolio. As candidates progress through their course work they can select specific artifacts from their formative portfolio for inclusion in the summative portfolio. Currently the summative portfolio is based on both ISTE and INTASC teaching standards. The artifacts selected to be included in the summative portfolio must go through a reflection stage. In this process the teacher candidate reviews the artifact and then refines it with the assistance of college faculty. Since college faculty have already reviewed the artifacts this process assists in the evaluation of the summative portfolio. Once these artifacts have been refined and polished they then become part of the candidate's summative portfolio and are available to be view by appropriate audiences.

The use of a digital portfolio at UNO has lead to unexpected benefits for candidates and instructors. Since instructors work with PT3 staff to develop individual course portfolios, each one is customized. This has lead to another dimension of the teaching portfolio beyond collection, selection, reflection and presentation. This added dimension involves teaching and learning. The use of technology combined with collaborative efforts of the PT3 team and instructors permits the development of activities that fully integrate teaching and assessment. Some activities that become artifacts in the portfolio require candidates to collect data and then analyze it. Prior to using the digital portfolio candidates were able to use only the data they collected. As a result of allowing candidates to enter the data into the web-based database, they have the advantage of sifting through all of the other candidates' data in order to gain a greater understanding of the teaching process. Journal entries and reflection on field placement activities that were originally placed in paper portfolios now take on a new dimension. Including them in the digital portfolio allows the college faculty to give candidates rapid feedback on their reflections and has helped to communicate potential problems and resolve them in a timely manner.

UNO's digital portfolio is still a work in progress and as the process evolves it will be refined to make both the learning and assessment process one that will serve teacher candidates and faculty.

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Using Digital Video Tools to Promote Reflective Practice

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Abstract: This paper reports the findings of preliminary trials using digital video and digital video editing to encourage reflective practice in preservice teacher candidates. Initial digital video editing projects were piloted to guide future program-wide efforts to integrate digital video tools for capturing and reflecting on teaching practice in a meaningful and productive manner. Issues of technology skill development, access to hardware and software, in addition to the technical aspects of collecting, editing, and publishing large video files all affect program-wide integration. Strategies and technologies for addressing these issues and implications for future research are suggested.

Introduction

Capturing and assessing the performance of teacher candidates in the field is an integral part of traditional teacher education programs, and technology tools play an instrumental role in efforts to document performance. A study of the student teachers' reflections on videotaped performance suggests that the use of videotape supports the development of reflective practice (Jensen, et al., 1994). Recent developments in digital video technologies permit teacher candidates to collect, review, and manipulate video to demonstrate their growth as a professional and as a reflective practitioner. Models from the Bank Street College of Education suggest that reflective practice should be nurtured within the context of teacher education programs (Freidus, 2000). Current technologies exist to simplify the integration of digital video and digital video editing into teacher preparation programs, allowing faculty to foster reflective practice, while candidates develop valuable technology skills throughout the professional phase of their programs. The Department of Education at Wake Forest University established long-range goals for the teacher education programs that include program-wide integration of digital video recording and editing for all teacher candidates. Pilot studies with teacher candidates using digital video camcorders and digital video editing equipment have generated information about the process as well as questions about the content of final performance products. Efforts to determine the best technologies for capturing and storing large, high quality video files in a way that meets the needs of the department and the candidates resulted in the purchase of DVD-R equipment which facilitates the creation of non-linear videodiscs without requiring authoring skills. This article focuses on the technologies used to support the process of recording, editing, storing and retrieving large video files, and considerations for program-wide integration.

Digital Video Tools

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Several tools are necessary to collect, edit, and store large digital video files. Although VHS videotapes can be easily digitized for editing on a computer, the advantages of capturing video directly on miniDV make it the preferred method for data collection in the classroom. The smaller, more discreet camcorder makes taping in a student-centered classroom easier, and FireWire/IEEE connections allow fast transfer of data to a variety of storage options. Inexpensive video-editing software applications are easy to use and provide enough options for developing attractive and professional video products. Access to digital editing software on a laptop allows teacher candidates opportunities to review, reflect, and edit their videos with more flexibility than use of a desktop in a lab, even when the camcorder and laptop are shared among several teacher candidates. Short, simple videos consume a lot of space on the hard drive (a fifteen-minute movie take up to 3.5 GB). Storage space for lengthier movies, or collections of student work, presents a challenge. When candidates share a laptop for editing, it is not possible to store unfinished projects on the hard drive, so any unfinished editing projects are saved onto miniDV tape for later editing. Currently, completed video projects are stored on miniDV tape for output to VHS for the candidate to take and share with potential employers. The ease of use and multiple playback options led to DVD-R as the choice storage medium for departmental archiving of video projects generated by all teacher candidates. The camcorder can be connected directly to the DVD-R with FireWire for high speed transfer of video files. Recording directly to a DVD-R obviates the need for the user to possess multimedia-authoring skills and generates a versatile storage solution for the large, high quality video files. On screen buttons and barcodes can be created to facilitate non-linear access to student projects on DVD for analysis of teaching methods, documentation of performance-based assessment, or for presentations. The current assumption is that VHS tape is the most useful storage medium for teacher candidates because of price and the potential for playback to a variety of audiences. But the department is ready to provide teacher candidates with DVD-R copies of their videos as price of DVD-R drops and availability DVD playback equipment becomes more ubiquitous in the educational arena.

Program-wide Reflective Practice - Implications for Integration

Preliminary projects have produced several noteworthy results for integrating student-created digital video projects into teacher preparation programs. Perhaps the greatest influence on program-wide integration is the realization that the creation of a meaningful and reflective video takes a great deal of time; not because of technology, but because critical reflection is a skill that teacher candidates are just beginning to develop during their programs. Candidates participating in initial projects admit that the editing process encourages them to pay close attention to videos of their teaching and requires them to be critical about the clips they select to communicate their growth. Results indicate that candidates spend a great deal of time selecting video clips to communicate their growth, but less on reflection of the performance captured in the video segment. Candidates are quite capable of creating quality videos, but pilot studies suggest a need to improve the quality of their reflections. This revelation supports the program-wide reflective model in use at the Bank Street College of Education (Freidus, 2000).

It is clear that all faculty teaching in the professional preparation phase of teacher candidate development must participate in this learning process. Thus, faculty acceptance of this method for developing reflective teaching videos is necessary when the process spans the professional preparation phase of the program. Getting faculty to embrace this new process is the result of several factors. Presentation and discussion of pilot projects during faculty meetings help generate awareness of the potential of digital video editing and acceptance of this method for recording candidate performance and reflection. Further, selection of technology tools that are simple, effective, and do not detract from the content of the video also encourage faculty to participate in this change. Finally, pilot projects give all faculty an opportunity to contribute to the development of the video-reflection process and encourage input on the process, protocols, and expectations for candidate performance.

The Department of Education at Wake Forest University is currently in the second phase of pilot projects with digital video collection, editing, and reflection. Results of phase one pilot projects generated insights into the use of digital video technologies, and guided purchase of equipment necessary to support the process for all teacher candidates. The second phase of pilot projects will focus on methods for improving the quality of the video reflections while expanding faculty participation. An internal Culpeper grant has been

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awarded to one faculty member to consolidate the results of the pilot projects and develop an integration outline with protocols for video capture and reflection that can be used by the department. The goal is program-wide integration for all teacher candidates beginning academic year 2002-2003.

Conclusions

Although technology is integral to this process, the decision to use digital-video tools to support the reflective practices of teacher candidates is a departmental commitment to changing performance-based assessment. In order to reach the long-range goals successfully, it is vital to engender the support of every faculty member involved in the process. Teacher candidates are capable of using digital-video editing tools, are eager to embrace this method for documenting performance, but need help with critical evaluation and reflection. Making the decision to integrate digital-video editing and recording tools is an expensive commitment, and there is no turnkey solution that works for teacher preparation programs. A great deal of effort is necessary to research, plan, and practice with technologies to determine which resources meet the needs of the program goals and the people involved in the process, now and in the future. The focus must stay on the final product, and technology should facilitate, not drive, the development of quality video-based performance assessment. Finally, the need to plan, practice, revise, and reflect on the process of program-wide integration takes the time and efforts of faculty working in concert. Although a slow and detailed process, the lessons learned from initial pilot projects provide important results that shape permanent changes in performance-based assessment and technology integration in the teacher education program. These lessons, so far, have proven valuable to moving the department closer to its long-range goals of requiring video-based teaching reflection projects of all teacher candidates and providing meaningful opportunities to promote reflective practice throughout teacher preparation program.

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Promoting Standards, Assessment, and Technology Competencies Through Digital Portfolios

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Abstract: This paper discusses the process of integrating web-based electronic portfolios into the training of pre-service and inservice teachers as part of a college-wide effort to integrate technology competencies and technology-based pedagogies into the training of teachers. In an attempt to establish a systematic method for addressing the numerous standards that they are expected to adhere to and document, a graduate level educational technology class was re-designed to include the documentation of both teacher candidate and p-12 learning within the digital portfolio framework. Both inservice and pre-service teachers sought to demonstrate technology competencies as well as learned society and college goals via the use of digital portfolios. Success of the revision will be measured by diagnostics of technology competencies, assessment of professional organizational standards addressed in sample work, and self-assessment by students. Preliminary data are presented as well as feedback from students and their content area professors concerning the portfolio organization, standards addressed, confidentiality, media delivery and storage issues, and assessment methodology.

Introduction

Institutions that prepare teachers currently find themselves in a sea of standards that they are expected to meet. Nearly all accrediting agencies (NCATE, SACS), professional teacher organizations (NCTM, NCSS, etc.) and organizations focused on educational technologies (ISTE, AECT, etc.) have developed standards that are used to gauge in service teacher's knowledge, skills, and expertise in leveraging technology in their teaching. In addition, teacher preparation institutions are now expected to document not only their teacher candidate's competencies and knowledge but also those of the P-K students who interact with the teacher candidates. The sheer volume of these standards and accompanying assessment needs can be intimidating and frustrating for those trying to adapt existing assessment methods or develop new ones that accommodate these standards. Add to this the institutional, unit, and program goals and objectives that address the use of technology and it becomes clear that assessment of both inservice and pre-service teachers' ability to use educational technology should be viewed holistically rather than individually.

Portfolios have emerged for both teachers (Barrett, 2000; Martin-Kniep & Giselle,1999) and students (Chen & Martin, 2000; Goldsby & Fazal, 2000) as tools for reflective learning and self assessment, documenting growth, and providing evidence of mastery. In addition to providing evidence of content and pedagogical skills and knowledge, digital portfolios provide an authentic means to embed technology standards into the assessment process in the proper context: as a teaching and learning tool rather than a competency separated from the context of teaching. The use of technology with a process based portfolio approach provides an easily accessible and transferable product for the documentation of teacher education program effectiveness to local, state, and national agencies (Smith, Harris, Sammons, Waters, Jordan, Martin, Smith, & Cobb, 2000). This would also seem to be an efficient means to demonstrate mastery in an authentic performance of educational technology standards.

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The Pilot Study

The college of education at East Tennessee State University has begun to revise core education courses for teacher candidates to include technology as an integral and appropriate tool for inquiry, communication, research, assessment and development. Rather than institute a static, "one size fits all" approach to the course revision process, we elected to develop a dynamic and flexible method. Pioneering the process is MEDA 5400: Integrating Technology into Teaching and Learning. This graduate level course is designed for both preservice and in-service teachers enrolled in one of four areas of the masters of teaching program. The course was redesigned in the fall of 2001 and will be implemented in the spring of 2002. Following the recommendations of a needs assessment preliminary guidelines were developed for the digital teaching portfolio which addressed organization, assessment, program area implementation, storage and distribution.

The revised course assignments (explicitly linked to the ISTE standards for teachers as well as other college and unit goals) require a planning document addressing content standards (professional society, state standard, etc.) as well as ISTE standards for students plus an authentic field based artifact(s) documenting evidence of learning. Each of assignment is placed into a "developing portfolio" of digital files. As the semester progresses each student will have the opportunity to reflect on and revise the assignments. The final product reveals growth as well as "best work". Thus an account of p-12 learning is documented as well as their own increased skills, knowledge, and dispositions. This dynamic system will provide pre-service and in-service teachers with the tools and opportunities to select multiple ways of viewing their evolving teaching practice, reflect on that practice, and use various representations to meet performance-based assessments as they build digital multimedia portfolios

Evaluating the effectiveness of this approach includes documenting changes in curriculum, evidence of teacher candidate and p-12 learning (both content area and technology). Assessment will include pre and post course performance based assessment of the NETS for teachers, self-assessment of candidates on their use of technology, and portfolio assessment of technology integration. Teacher candidate's digital portfolios will all be evaluated as a part of their program area assessment, with new criteria for the use of technology to enhance classroom teaching. Finally, program area professors, field based teachers, and p-12 students will be asked to critique the teacher candidate's effectiveness in both their content and their use of technology.

As we adapt to the use of this process to document standards and performance indicators in preparation for utilization in Spring 2001, courses are being modified and a "phase in" plan is being developed that allows for adjustment and absorption by both faculty and students. Based upon the quantitative and qualitative data gathered we plan to revise and improve the portfolio process to document performance standards in multiple domains, producing a system that is both standards based yet flexible.

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Electronic Portfolios in Evolution

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Abstract: Electronic Portfolios in Evolution describes a dynamic process of transformation. The story began with a single university class attempting to present limited artifacts of teaching skills electronically and is now moving to an entire school of education working together to create electronic portfolios based on INTASC and ISTE standards. Also included are the AIMS standards, which are the goals exclusive to the Department of Teacher Education.

This project is called Electronic Portfolios in Evolution because, just as horticulturists can take a wild fruit and through cross pollination, grafting, and selective reproduction produce a wonderfully delicious and beautiful fruit, so have the electronic portfolios at Brigham Young University come from a crude beginning and matured into something quite desirable. This maturation involved cross-disciplinary conversation within the David O. McKay [DOM] School of Education, which led to refinement of the portfolios through both augmentation and reduction.

Overview

This paper will show how electronic portfolios developed by elementary education majors at Brigham Young University evolved through:

- Collaboration with other faculty members,
- Ongoing conversations with small groups of students,
- Input from public school administrators,
- Technical support from the department in both equipment and personnel,
- Help from PT3 funding for training (both local and national), and
- The enthusiastic desire of students to create electronic portfolios.

This evolution was made possible through a PT3 grant i.e. training of faculty and public school people from the BYU Public School Partnership, training of lab assistants to provide help to the students doing electronic portfolios, utilizing the expertise of specialists (such as Helen Barrett), attending national conferences (SITE), and numerous other helps.

Another component that helped in the evolution of the electronic portfolio was bringing on board master teachers from the public schools to spend two years at the university assisting in the teacher education program. These teacher educators (called Clinical Faculty Associates) brought outstanding technical skills that have had a major impact on the development of electronic portfolios.

The following chronology will tell the story of the evolution of electronic portfolios over the past three years in the Teacher Education Department at Brigham Young University.

Chronology of the Evolution

Spring 1999

The idea of the electronic portfolio was born out of a request from the department chair that something be done by a cohort (a group of approximately thirty students who take all of the education courses together) to involve the students in using technology. As the cohort class was not a technology class, the first challenge was to find something required in the class that could be done better with the use of technology and not merely add another assignment to the extremely heavy workload of the students. After a careful analysis of the course assignments, the instructors decided to replace the students' least favorite assignment, the paper show portfolio, with an electronic portfolio. Students had complained that the traditional portfolio was of little or no value since employers were not interested in seeing them. Electronic portfolios seemed, by their very nature, to have greater potential appeal to the students as well as the ability to show to a broader degree the strengths of the pre-service teacher.

Summer 1999

One of the cohort's instructors took a class on "Creating Electronic Portfolios". The creation of what seemed to be a simple product became a nightmare when an attempt was made to include a small sound file. The rendering of the file was so slow that the thought of including sound and video files in the electronic portfolios seemed nearly impossible. Nevertheless, the idea of using video and sound in an electronic portfolio was presented to the department chair. Discouragement once again set in as he explained the vast amount of memory required for digital video and the lack of available hardware within the college to make its use feasible.

Although the path leading to the creation of electronic portfolios was daunting, a vision had been created in the mind of the course instructor. The advantages of an electronic show portfolio over the paper version as envisioned at that time were: to create a portfolio that would be of interest to employers; to show the students' personality, teaching strategies, and management through video; and to showcase students' technological skills. The first experience of having students create electronic portfolios would have been best characterized as a lonely, painful expedition; there was no one else in the department producing electronic portfolios with whom to collaborate.

Fall 1999

Naiveté on the part of the instructors allowed them to start the horrendous process of developing electronic portfolios with a cohort of students. The idea of changing to electronic portfolios was presented to students. Students were given the option of either continuing with the traditional paper portfolios or creating portfolios in electronic format. All thirty students chose to do electronic portfolios. The categories for organizing the electronic portfolio were the same as those used with the paper version, i.e. educational philosophy, effective teaching, classroom management, the learner, diversity, personal and professional development, curriculum, assessment, and parents and community. Those involved in this project had no suspicion of the challenges they would face breaking new ground at the university in capturing and editing video, creating multimedia presentations, accessing hardware to compress video, and utilizing hardware to burn CD's.

After attending a class offered by the university, the instructors decided to use PowerPoint as the software for organizing and presenting the portfolios. They soon discovered that many of the students were unfamiliar with PowerPoint, and none showed any skill in capturing and editing video. Since outside help to teach PowerPoint was not available, a team member condensed the PowerPoint manual into a simplified step-by-step tutorial that could be used in creating the electronic portfolio.

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Winter 2000

The first real challenge in the project came after the thirty students had all been videotaped. How would they import the video into their portfolios? Not only were the students lacking the skills to perform the task themselves, but also the required hardware was not available to undergraduate students. Expertise from another faculty member was sought and the grueling work began for one of the instructors to capture and compress all the video clips and burn them onto CD's for the students to include in their portfolios. To determine whether or not they were pursuing the right course, the instructors searched the internet for examples of electronic portfolios with minimal success, leaving little possibility for comparison.

The first electronic portfolios generated did effectively demonstrate that video and still images greatly enhanced the visual appeal of the presentation of students' abilities. However, both the format and content of the portfolios were in the initial stages of the evolution.

Spring 2000

As an assistant to the dean and others in the department saw that electronic portfolios were becoming a reality, funding was given to purchase two additional digital video cameras and offers to give additional support were made.

Summer 2000

Through a PT3 grant, summer workshops were offered providing training in creating multimedia presentations in PowerPoint, digital imaging, adding sound to presentations, and scanning. These seminars gave those involved in the project greater confidence in their own technological skills as they assisted students with their electronic portfolios.

Fall 2000

Electronic portfolios were introduced to a second cohort. As with the first group of students, they were given the option of compiling either the traditional paper portfolio or an electronic one. Once again every student chose the electronic format.

Problems in creating the electronic portfolios experienced by the first students were still in place with the second cohort. One of the goals for this group was to give them more responsibility in capturing and editing the video before its compression. This was extremely difficult because of the availability of only one computer in a graduate student lab to accomplish the task. Students had to schedule their work around the graduate students' use of the computer, which added additional stress in the development of the electronic portfolios.

As an assistant to the dean learned of the difficulties students were having in gaining access to the hardware needed, he arranged for the new computer lab that was under construction at that time to be modified to help meet the needs of students doing electronic portfolios. Five video editing stations were added to the original plans, complete with software, CD burners etc.

A fellow professor and one member of the technology support staff in the department worked with the cohort instructors to train them in the use of iMovie and other software. They were also instrumental in seeing that lab assistants in the new lab would be trained to give support to the students.

Technology workshops continued to be offered by the department to give assistance. The employee in the department over external affairs attended conferences and brought back ideas of what others were attempting to do with electronic portfolios.

A turning point in the evolution of the electronic portfolios came as the professor assigned to evaluate the department goals and student growth viewed several samples of the portfolios. As one student showed his electronic portfolio and then proceeded to tell this professor what he had learned from creating the portfolio and the insights he had gained into his teaching strengths and weaknesses, the professor responded, "That's what should be in the portfolio." As the electronic portfolios were shown to other

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professors and staff, similar comments were made. There was a glaring weakness in the electronic portfolios--the lack of reflections.

The focus up to this point had been in refining the technical aspects of portfolios, but after those conversations changes were made to incorporate more reflection on the artifacts in the portfolios.

Winter 2001

A great boost came as the department adjusted scheduling to allow a professor who created video teaching ethnographies with his students to also teach the cohort. Since his teaching ethnographies required students to create a CD with video clips of their teaching, they were learning skills and gathering artifacts that would be used in compiling their electronic portfolios. Collaboration took place as instructors from both courses worked together to provide experiences in the public schools for students to record and analyze their teaching philosophies and practices.

During this semester the new computer lab was finished, which gave students access to the hardware and software needed for their electronic portfolios. However, problems still existed as computer lab assistants lacked sufficient training in the software being utilized, and graduate students used all the hard drive space for their projects. As difficult as it was, students were still successful in creating their electronic portfolios, and the workload for the instructors was significantly reduced. Portfolios produced that semester were also more reflective than those from previous cohorts.

The INTASC standards were presented to the education faculty as the standards the state would be using for new teacher licensure. They were then introduced to the students as a possible framework for organizing their portfolios. This was the beginning of a shift from showing evidence of being able to meet local expectations to meeting teaching standards (INTASC) more widely recognized throughout the country.

Samples of electronic portfolios from the cohorts were shown to all thirty-eight elementary school principals in the Alpine School District to see if they would be interested in viewing electronic portfolios as part of the hiring process for new teachers. (Previously, principals had not shown interest in seeing paper portfolios.) All principals indicated in a questionnaire they would like to view the electronic portfolios when interviewing.

Two of the cohort instructors attended the SITE conference in Orlando along with other department faculty. At that conference, another milestone in the evolutionary process occurred. Helen Barrett[1] opened their vision to the deeper, more encompassing purposes of electronic portfolios. To this point, portfolios produced by cohorts were collections of artifacts with some reflection added. It was evident that previous efforts at producing portfolios had focused on creating show portfolios for prospective employers. Working portfolios, with the tremendous opportunities they afford students to evaluate their practices and philosophies, had not been given adequate emphasis. It was determined while at the SITE conference to arrange for Helen Barrett to conduct a workshop at Brigham Young University for the faculty in the David O McKay School of Education.

The leadership in the David O McKay School of Education committed the necessary resources to make it possible for education majors to construct electronic portfolios. Because of this commitment the Alpine team presented samples of electronic portfolios to partnership liaisons and leaders responsible for the cohort program in other school districts. This group seemed impressed with the electronic portfolios; however, most felt they were not ready to attempt electronic portfolios because of inadequacy with technical skills. To address concerns and help in the creation of electronic portfolios a task force was formed. This task force began a dialogue with those who teach the technology courses and other faculty to build a support system for students to create portfolios electronically.

Summer 2001

Helen Barrett instructed the faculty for three days in the purposes of portfolios and how they could be enhanced electronically. Her instruction proved helpful in refining and emphasizing the goals of the working portfolio.

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[1] Helen Barrett, professor at the University of Alaska Anchorage, is a leading authority on electronic portfolios in teacher education. See her website at: http://transition.alaska.edu/www/portfolios.html

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Fall 2001

The purposes of the portfolio had now evolved into an opportunity for students to carefully study their teaching as they progressed through the teacher preparation program and to design a sampling of their philosophies and skills that would be of interest to prospective employers. They were built upon the INTASC standards with ideas from Helen Barrett added to refine what had previously been done. The fall cohort had already spent a semester working on their portfolios, so they were not required to change the structure of what they had started but were invited to make the change if they desired. Fifteen of the twenty-three students adopted the INTASC standards and incorporated many of Helen Barrett's ideas.

A high point of the semester was the enthusiasm the students exhibited as they caught a vision of how the portfolio could show evidence that they were meeting generally accepted teaching standards, both during their pre-service experience, and as they met licensure requirements in the first years of teaching. Students who desired were invited to meet with the instructors beyond class time to collaborate on developing electronic portfolios. Students were anxious to meet to share ideas, ask questions and get feedback. The synergism of the group was tremendous as they realized ownership of their portfolios. Much of the energy seemed to come as students recognized that their ideas were valued as much as those of the instructors. They moved from merely collecting artifacts for an assignment to gathering evidence of their own teaching skills.

Some BYU faculty and teams of technology leaders from the partnership districts traveled together to the Classroom Connect Conference in Las Vegas for the purpose of building cohesion in the technology skills taught at the university and those needed by classroom teachers. Many benefits came from the conference, but one in particular was the district's support of electronic portfolios. Since the majority of the new teachers in Alpine District come from BYU, they were excited to learn of the skills that the graduates would bring to the district. They expressed their support for continuing electronic portfolios with those new teachers as they collect evidence to meet licensure requirements during their first two years of teaching.

Several other administrators from the Alpine District met with students and viewed their electronic portfolios. Involving the administrators had a two-fold purpose. The main objective was to provide feedback to the students from a public school viewpoint. Another objective was to evaluate the portfolios in general to see if they actually showed (from an administrators' point of view) evidence that students met the INTASC standards. The response was very favorable from the administrators, but showed that the working portfolios would need to be modified to accomplish show portfolio goals.

Several students who produced portfolios in previous semesters provided some interesting insights into the worth of the project. One stated she was very grateful she had produced her portfolio because of the technological skills she had developed. Another stated that even though the technical aspects of creating her portfolio electronically had proven beneficial as she began her teaching career, she valued the insights she gained into her teaching much more highly. She felt that viewing herself as she taught from an outside perspective was invaluable.

The Future

Electronic portfolios seem destined to play a prominent role in pre-service education at Brigham Young University. Greater acceptance of the INTASC standards within the [DOM] School of Education and more varied technological skills of the faculty are creating an openness to change. The value of media not traditionally connected with paper portfolios in reflection is beginning to open the vision of a relatively new resource to analytical minds.

As the evolution continues, possible changes being considered are: (1) Utilizing HTML format to allow easier accessibility in the show portfolio and to enable artifacts consisting of full pages of text to be displayed in the working portfolio. (2) Beginning the working portfolio in the semester before entering the upper level course work and continuing gathering evidence throughout the two cohort semesters. (3) Creating the show portfolio after the student teaching experience.

Just as cross pollination in the plant world can be used to produce a more desirable fruit, flower or vegetable, so can collaboration improve practices in education. Collaboration has been and will be essential in the evolution of the electronic portfolio.

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A Comparison of Two Electronic Portfolio Models

Sebastian Foti, University of Porto, Portugal, US

Introduction

In this session we will share the beginning year of two electronic portfolio projects. One at the University of Porto, Portugal, the other at the University of Florida, Gainesville, Florida, United States (http://www.coe.ufl.edu/school/portfolio/index.htm). These projects were developed and implemented independently of one another yet have many similarities. Our experiences have shown that electronic portfolios have the potential to contribute to a richer learning environment for students, and encourage students to reflect more on their learning and education. In addition, portfolios are changing the way professors and colleges of education approach assessment.

The Projects' Goals

Pedagogically, the assemblage of an electronic portfolio is a classic example of a constructivist activity. Dewey (1915) believed that true, new knowledge and intellectual growth are constrained by the systematic teaching method of assignment, study and recitation, and instead argued for a more learner-centered classroom where exploration and engagement were encouraged. Both colleges believe that the construction of an electronic teaching portfolio enables students to continuously construct and revisit their knowledge, beliefs, and biases about the profession.

The purposes of the electronic portfolio at both schools are to:

- present student selected illustrations of competency
- effectively use and integrate technology in their educational experience
- develop and present a professional vita over time
- provide a forumfor connecting a student's university experience to personal and professional insights.
- assist the student in coming to a better understanding of their profession

The portfolios are organized around the following pedagogical and technological goals:

- encouraging student reflection
- promoting student self-assessment
- Using technology for communication, development, and publication

Lessons Learned

We will share the similarities and differences of the two programs, the conceptual frameworks that undergird each program, and the support mechanisms that facilitate their implementation. In addition, actual student portfolios will be shared. Future goals and project objectives will also be presented.

Conclusion

Portfolios may be used effectively to model 21st century uses of technology to preservice teachers. As students began to reflect on their work and their learning experiences, they began to discuss ideas with their peers.

Both colleges continue to have questions about portfolio development. We believe that by managing the vast amount of information in their portfolios, deciding how to build a public representation of their accomplishments and of who they are, and trying to integrate the various components of their public and personal histories, our students will develop skills and perspectives that will serve them well in the future. The construction of an electronic teaching portfolio forces students to continuously construct and revisit their knowledge, beliefs, and biases about the profession.

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The RIMS/BTSA Electronic Portfolio for Teacher Professional Development

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Scott Lowder, Graduate School of Education, U.C., Riverside, US

Introduction

This presentation focuses on the development of an electronic portfolio project designed by the Riverside, Inyo, Mono, San Bernardino Beginning Teacher Support and Assessment (RIMS/BTSA) program, a large scale beginning teacher induction program in the State of California. Providing mentoring and support services to over 1,400 new teachers and 700 support providers per year, across 56 school districts in 4 counties, RIMS/BTSA is the largest and most geographically dispersed beginning teacher induction program in California. In order to meet new State requirements mandating that the program be responsible for performance-based assessment as one of the components of licensure for the beginning teachers, the program elected to develop an electronic portfolio to manage this new and logistically challenging task.

Prior Art: A Literature Review of Portfolios in Teacher Professional Development

A review of extant literature on portfolio usage and design will be offered as an introduction to the presentation of the RIMS/BTSA Electronic Portfolio for Teacher Professional Development © (EPTPD). This review will examine the topic from three different perspectives: (1) the usage and effect of portfolios with individual teachers (micro-level), (2) the dyadic and social interactions that portfolios engender between teachers, their mentors, and their community of learners (mezzo-level), and (3) the interface between the first two levels and the need of institutions which train and monitor teachers to be able to conduct performance-based evaluations as a part of teacher licensure (macro-level) (Fisher,1994; LaBoskey, 2000; Polonoli, 2000; Milman, 1999; INTASC, 1998). The inherent tensions and emergent benefits resulting from the attempt to maintain the essence of the teacher portfolio while incorporating them into a larger framework of accountability and assessment will be addressed. Additionally, the conceptualization, design, and usage of previous electronic portfolios and how those projects have informed the RIMS/BTSA EPTPD© will be discussed (Penta, 1998; Barrett, 2000).

Description of the RIMS/BTSA EPTPD©

In January of 2001, the RIMS-BTSA collaborative partners designed an electronic portfolio pilot program to be implemented in the 2001-2002 school year. Over the following six months, RIMS/BTSA technical and research staff at the University of California, Riverside outlined the purposes of the electronic portfolio. These include:

1. Increasing the mentored, reflective practice for new and experienced teachers
2. Promoting dialogue among experienced and new teachers, even when geographical distance is prohibitive
3. Allowing new teachers to demonstrate competencies across the California Standards for the Teaching Profession (CSTP)
4. Providing a "real-world" compliment to the *California Technology Standards for Teachers* and encouraging technology usage and competency for new teachers
5. Providing RIMS/BTSA administrative staff with an organized, high-speed system for performing authentic assessment of new teachers which would be tied to the pre-existing RIMS/BTSA Information Management System

Based on the experiences of other projects which have used electronic portfolios, the UCR RIMS/BTSA staff also established several minimum technical requirements for the EPTPD©. The EPTPD© should be:

1. A World Wide Web based application– in order to ensure high availability and easy access
2. Cross platform / browser compatibility – the system must be accessible by PC and Macintosh computers, running either Internet Explorer or Netscape browsers
3. File type flexibility – the system must be able to accept and display a wide variety of media types. This includes video, audio, Adobe Acrobat PDFs, HTML documents, PowerPoint presentations, photos, and simple word processing documents, etc.

The EPTPD© was constructed as a web application on a Windows 2000 web server running IIS 5.0, Active Server Pages, and SoftArtisan's FileUp component. Database features are maintained through Microsoft Access 2000. The portfolio has a "working area" – a completely private zone for the new teacher, an "assessment area" – accessible to the new teacher's support provider and the RIMS/BTSA program, and "presentation area" – a publication option which posts selected portions

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of the portfolio to a common area accessible to the entire community of learners. Finally, a copy of the portfolio is provided to each participant upon exit from the RIMS/BTSA program on a CD-ROM disk.

The Case Study: Data, Interactive Demonstration, and Discussion

By capturing the conceptualization, construction, and implementation of the RIMS/BTSA EPTPD© as a case study, this presentation examines each major step in its development within a complex organizational and institutional consortium. Some of these steps include:

- The processes of capturing the essence of a teacher development portfolio in a fully digital environment
- Examining the strengths and weaknesses of previous electronic portfolio projects
- The decision to build a custom, in-house solution from the ground up
- Hardware, software, and staffing requirements
- Programming languages
- Coordinating training and mentoring of the EPTPD© in member districts
- Training new teachers and support providers to use the EPTPD©
- Assessment methods for new teacher portfolios in the EPTPD©
- Testing and trouble-shooting
- Lessons learned from successes and false starts

As part of the presentation, client computers will be available for seminar participants to use all aspects of the system, including the participating teacher interface and the support provider interface.

Research Components / Assessment of the System

A mid-project report based on participating teacher and support provider self-reports will be presented. This information will be collected through surveys, focus groups, and individual interviews. Data collected from project participants will include perceptions of the EPTPD©'s efficacy as a staff development and assessment tool, its ease of use, and its ability to provide applied instruction in technology. Qualitative information gathered by EPTPD© trainers during training sessions will be included to provide insight into these issues. Interviews with districts officials involved in the project will also be conducted to incorporate the view of the EPTPD© from an administrative perspective.

[1] Support for this project is provided by the UCR Graduate School of Education and the Riverside County Office of Education. Data are provided by the Riverside, Inyo, Mono, and San Bernardino (RIMS) Beginning Teacher Support and Assessment (BTSA) program of California.

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Electronic Portfolio Assessment in Teacher Education

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The School of Education at Northern State University is using the electronic portfolio as an assessment tool and as a means of integrating technology throughout teacher education. The electronic portfolio offers a unique opportunity to build preservice teachers= proficiency with technology as well as showcase their expertise in teaching.

This institutional session will focus on the process used to develop electronic portfolios and the method used to implement electronic portfolio assessment in teacher education. In addition, participants will have the opportunity to view student-created electronic portfolios guaranteed to knock their socks off!

Why electronic portfolios? Electronic portfolios emphasize process as well as product and are multi-sensory in nature. They provide the perfect format for facilitating the integration of technology throughout the teacher education program. Let=s investigate three reasons why portfolios have become so popular in the field of education.

First, today=s educators have embraced constructivism -- the belief that teaching is an active and learner-centered process. This philosophy recognizes that students build their own understanding of the world by using what they already know to interpret new ideas and experiences. Constructivists emphasize not only what students know, but what they do.

Secondly, the growing interest among colleges of education in performance assessment makes a transcript of grades and a score on the National Teachers= Exam (NTE) seem inadequate indicators of competence. A wise person once said: AThere is a lot of difference between naming the tools and building the house.@

And thirdly, there is stiff competition for teaching jobs in most areas of the country. It is imperative that prospective teachers be able to demonstrate their teaching competence in concrete ways -- to university faculty, to prospective employers, to policy makers at the state and national levels, to parents, the media, and the general public.

After piloting the use of electronic portfolios with 12 teacher education students during the 1998-1999 academic year, the School of Education at Northern State University began implementing electronic portfolio components into teacher education methods courses. The elementary education program was targeted during Year 1, the secondary education programs were targeted during Year 2,and this year the focus is on K-12 programs in art education, health and physical education, music education, and special education. The model used for electronic portfolio integration solicits proposals from faculty members planning to add electronic portfolios components to their methods classes. To date, twenty-one methods instructors have received summer stipends to plan and integrate electronic portfolio components into their courses.

Teacher education faculty members are currently creating a rubric that will be piloted during the electronic portfolio showcase in December. Two education faculty members will review each student=s electronic portfolio using the newly-created rubric to guide the assessment process. Students= portfolios must demonstrate mastery of the ISTE National Technology Standards (NETS) and performance indicators for teachers. In addition, students must address each of the five components of the knowledge base for teacher education at Northern State University: Knowledge of Self as an Individual, Knowledge of Content, Knowledge of the Learner, Knowledge of Pedagogy, and Knowledge of Self as a Teacher and Member of a Learning Community.

The implementation of electronic portfolios in teacher education programs at Northern State University has not been without challenges; however, teacher education faculty believe, as did Dewey (1904), that Athe purpose of education is to allow each individual to come into full possession of his [or her] personal power.@ In this regard, electronic portfolios rule!

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IMPLEMENTATION OF THE E-PORTFOLIO

Grant Abstract

Preparing Technologically Skilled Novice Teachers
A University-Wide P-12 Collaborative

Eastern Kentucky University plays a critical role in reducing the digital divide that exists in its Appalachian service region. The importance of this role is magnified by the fact that EKU is the largest preparer of teachers in the Commonwealth and because our graduates serve one of the most educationally and economically depressed regions in the nation. Through PT3, EKU can substantially improve the preparation of teachers: enabling them to be more adept at applying technology to learning strategies which will, in turn, enhance student performance Our project has three major goals: (1) creating ""clusters"" of both Education and Arts and Sciences faculty, as well as pre- and in-service teachers, to work together to integrate content, pedagogy and technology through the redesign of technology-rich general education and educational foundations courses for future teachers; (2) establishing ""service units"" to coordinate and disseminate outcomes; and (3) creating an electronic/multimedia portfolio assessment system through which future teachers will document their proficiencies and amass strategies to enhance their future teaching.

Electronic Portfolio Rationale

The Eastern Kentucky University PT3 2000 implementation grant is a very unique, collaborative effort among the College of Education, College of Arts and Sciences, and P-12 partners with a focus on transforming the education of future teachers through the infusion of technology throughout the core curriculum.

As the largest preparer of teachers and educational professionals in the Commonwealth, our emphasis on teacher education is a campus-wide priority through which content areas, pedagogy, and instructional technologies are fully integrated.

Our cluster teams are working very hard to develop a core curriculum that continues to challenge our students through academic rigor while exposing them to cutting-edge technology. We are very excited about the positive impact the results of this grant will have on the preparation of our future teachers. As an example of this collaboration, two College of Education faculty members who were instrumental in the development of Eastern Kentucky University's original education portfolio, one College of Arts and Science biology professor, one P-12 teacher, the coordinator of educational technology and his graduate assistant formed the portfolio cluster. The charge of the "cluster" was to focus on reconfiguring the portfolio to an electronic format. The cluster worked for one year to develop a template for the electronic-portfolio (e-portfolio).

The e-portfolio is required of all Eastern Kentucky University teacher education majors and is based on the Kentucky New Teacher Standards. The e-portfolio provides an opportunity for students to showcase their course work and demonstrate their competence in implementing technology.

It is the intent of the presentation to share the framework for developing the e-portfolio and the implementation of its use in the Educational Foundations Class (EDF 203). Review of the objectives for the portfolio and the rationale for developing a template will be discussed.

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Successes and pitfalls of implementing the e-portfolio in eight EDF 203 classes taught by seven different instructors will be discussed.

Objectives for the presentation are to: (a) provide overview of the PT3 grant's objectives, (b) review objectives for the e-portfolio, (c) provide a framework for implementing the e-portfolio with approximately two-hundred and fifty students enrolled in an educational foundations class, (d) share observations of successfully implemented strategies and some failures, and (e) share reflections of the process of integrating the technology.

Electronic Portfolios: Where Should the Portfolios Be Stored?

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Abstract: Student portfolios contain artifacts from performance-based learning activities that attempt to substanti ate learning toward one or more measurable outcomes. Typically the parameters for portfolios follow traditional academic presentations on paper and videotape that are compiled, organized in a binder and presented at specific times for evaluation and comment. Electronic portfolios presented digitally and mirror web environments can include electronic pages hyperlinked together, multimedia, video and audio streams, and other presentation formats that enhance the work. A necessary topic in any electronic portfolio discussion is how and where to store the portfolio.

A student portfolio submitted on paper was never a serious consideration among the faculty in the elementary program. Their collective vision for innovation through a multi-year curriculum development process that aligned INTASC standards to NCATE guidelines and then state performance outcomes as well as maintaining institutional character always sought to have an electronic portfolio. How this electronic portfolio was to be developed and presented were the next decisions. Discussants were highly influenced by the pervasive growth and ease of use the World Wide Web offered. It captivated discussions about the way students could handily develop web pages that faculty could navigate through to read artifacts and reflections. It was the desire to use the web that plotted the course of action.

The faculty quickly learned that the onset of a course of action that includes innovations not common in day-to-day university operations necessitates convincing others that policy changes were needed and network functionality expanded to allow students access to a specific university server to develop, store, and present a portfolio. Initiated in 1995, the faculty had a series of early stage roadblocks that are more easily solved on most campuses today.

This paper reviews a three phase, six-year electronic portfolio history that began with a locally controlled Internet-based environment, a second phase allowing for intranet viewing only along with software support for video streams, and a third phase that outsources to a business which supports web based teaching resources, lesson planning, and allows for electronic portfolio development. When viewed across the developmental continuum, the third phase appears to be the most promising yet. The first phase, Internet-based portfolios, was brief as confidentiality concerns associated with pictures of schoolchildren posted on the Internet were too significant to overlook, and the second phase, intranet-based portfolios, is ongoing.

Electronic portfolio development in a performance based learning environment provides portability, scalable and robustness that simply surpasses what a paper portfolio accomplishes. The portability is evident as students are able to work on the portfolio from any networked campus computer, or with the use of file transfer protocol, ftp, portfolio access is even greater. FTP allows a student to retrieve the electronic portfolio, work on it, and then post it to the server for later use. From the faculty perspective, electronic portfolios can be accessed for review at designated times or upon request. No longer are paper notebook binders carried from place to place nor stored. All artifacts and reflections are presented digitally. Scalability, the second topic, is managed with web-editing programs such as Netscape's Composer, FrontPage, HomePage, etc. which make it possible for a browser to open files and navigate the portfolio with relative ease regardless of the development platform used.

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Electronic portfolios are robust. The flexibility of the web, video streams, animations, Flash, Splash, and other programs provide the portfolio developer with multiple tools to present her/his artifacts and reflections. When electronic portfolios are developed with an organizing template and pre-service teachers are guided through specific requirements and reflective writings, electronic portfolios simply supplant paper portfolios. Once the web page software is learned, portfolio development follows.
Storage issues are significant. How big will the portfolios be when graphics, animations, artifacts, presentations and video streams are included? Should individual student limits be set or can students have nearly unlimited amounts of server space to complete the portfolio? Initially, the unlimited size for each student electronic portfolio was confounded by earlier decisions. Mainly, a three bay server was purchased with an eight-gigabyte drive in each bay. Two drives where set up to mirror each other with duplicate student folders on each drive. Students could opt to develop on either drive. One was on the Internet and the other was intranet only. The first year of development this system worked well. Late in the second year disk capacity was maximized. This coincided with looming deadlines and high student demands on the server, an unfortunate time to realize the system's limits. Through the responsiveness of the university's network services technicians, the server was reconfigured to allow students continued use by breaking the mirroring which freed disk space. While this server continues to function, a larger server with 70 gigabytes of hard drive space was purchased. To date, only the storage demands for video streams have caused limits to be set.

Stability remains a critical issue. Placing the server on a network makes it available through student login procedures, and tremendous value-added elements are realized because the university's network includes redundancy, high priority server status for 24/7 maintenance, technicians, and regular software upgrades. The relationship with network services support personnel is important. Servers require regular maintenance, access codes, and eventual replacement. Further, backing up student files is an extremely important safeguard in the event of a physical server crash. Who does the data backup, how often, and where is it stored? The electronic portfolio server has data backed up every 24 hours, and a complete server back up each week. In the event of a physical crash, the server can be re-built with only the information from the previous 24 hours lost. Thus, establishing server priorities with network services, making back up data tapes, setting up utilities to add student portfolio folders, and servicing the server are important processes requiring time and expertise. Faculty often do not have time to take care of such routine matters, so university network services meet the electronic portfolio infrastructure needs.

At this writing, the third phase of portfolio storage is coming into view. There are a number of factors contributing to this change. Currently the two servers largely dedicated to electronic portfolios are aging. The department underwrites their replacement costs and must decide to use technology funds for servers or other technology for teacher preparation and academic needs. Given state budget shortfalls coupled with increasing technology demands in preparing teachers for P-12 schools, shifting to a third party service provider is likely. In addition, pre-service teachers can receive more services from a service provider than the university can provide. Costs are nominal especially for pre-service teachers. A one-time charge of approximately $60.00 allows the pre-service teacher multiple years of access and file storage in a web based work environment. Technology costs, replacements, software upgrades, technical support, and other user services are all included in the service charge. Shifting these ongoing costs and services away from the university to a business is fiscally sound. Educationally, the service provider organizes resources to assist learning and professional development. Through templates students can create new works, include state standards, add curriculum frameworks, access other lesson plans, locate web resources, specify lesson formats, link to websites, create webquests and more. Existing resources on the web site such as lesson plans are readily available for students to access, include, organize, and modify. The electronic resources can be organized into a portfolio and presented to specific faculty and students on the web for feedback and editing, or specific resources can be posted on the Internet for review and use. This purchased service is a significant electronic resource including state and professional society standards, lesson ideas, websites, etc. and simply surpasses what is currently available on the university's electronic portfolio support system.

The three electronic portfolio phases span a six-year venture into electronic portfolios. Each phase represents faculty innovations, their reflections, and responses to modify processes that allow pre-service teachers to take advantage of computer technology and present their learning and reflections in as useful a manner as possible.

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Where's the Science? The State of Science Content on U.S. Secondary and Middle School Web Sites.

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The World Wide Web has diffused from a handful of K-12 schools in the United States in 1993 to near ubiquity in 2001. At present, middle and high schools use the WWW as a vehicle for advertising the school and its mission, extracurricular activities (e.g. sports, clubs, and band programs), academic programs, calendars of events, alumni information, teacher and course web pages, and web pages constructed for and about students to highlight their academic work and projects. It is our contention that the latter category, web pages constructed by students that expand the audience for student academic work and projects, begins to capture the full potential of the World Wide Web in school settings.

In this study we investigated the degree to which student generated artifacts of science learning are represented in U.S. middle and secondary school web sites. A content analysis was performed on 20 randomly sampled high school web sites from each of the 50 states and the District of Columbia (total n=1020) to determine the presence and source or absence of science content. The sample was culled from secondary and middle schools listed by state in the Education Category of Yahoo (http://www.yahoo.com). Each web site was explored in depth to identify science content. A coding scheme was developed to represent the origin and purpose of science content:

0= No reference to science or science content present
1=Science content of an administrative nature (course and faculty listings)
2=Teacher generated science content (science faculty pages and course pages)
3=Student generated science artifacts (papers, projects, and web sites)
4=Exemplary student generated content

Preliminary results indicate that 40 percent of middle and high school web sites make no reference to science, a core academic subject. Approximately 30 percent of schools feature science information of an administrative or informational nature. Twenty percent of schools contained science teacher web pages or pages in support of their courses. Student generated materials were found in only ten percent of the web sites sampled. Of the ten percent, half featured student work that we determined to be exemplary and point in directions that communicate robust science learning in middle and secondary schools. Examples of exemplary web sites will be featured in this presentation.

We conclude that as the World Wide Web approaches the second decade of its presence in K-12 schools, on the whole it remains a one-way conduit into science classrooms. The full potential of the World Wide Web for science education will not be realized until the diffusion of information includes the artifacts generated by teachers and students, and central to teaching and learning, in their classrooms.

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A Large-Scale Web-Based Electronic Portfolio System: Developing the Purdue Electronic Portfolio (PEP) System

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Abstract: Electronic portfolios offer a powerful tool for students to demonstrate mastery of performance-based standards for teacher education. As one part of P3T3: Purdue Program for Preparing Tomorrow's Teachers to use Technology, Purdue University's School of Education is developing a large-scale, web-based, electronic portfolio system called the Purdue Electronic Portfolio (PEP) system. This customized e-portfolio system relies on a web-based interface to a database in Microsoft's SQL Server hosted on a large server with nearly two terabytes of storage space. The system allows students to store files and create artifacts, which are coherent collections of files coupled to reflective narratives that address specific standards. The system provides templates, which give users flexibility while providing ease-of-use and some flexibility. Completed artifacts are "published" as web pages. Pilot testing with several hundred users in the fall of 2001 suggests it is an effective tool.

Introduction

The national movement toward performance-based standards for teacher education has prompted much interest in the use of portfolios by pre-service teachers to document their knowledge and teaching performance (Barrett, 1999; Read & Cafolla, 1999). Portfolios are purposeful collections of student work that demonstrate effort, progress, and/or achievement (Barrett, 1999; Russell & Butcher, 1999). They are relevant to the student, individualistic, and can show growth and development over time, providing a richer picture of that understanding than can be achieved through more traditional, objective measures. They provide an opportunity for the pre-service teacher to demonstrate and organize his/her understanding of teaching and learning. Of course, they also provide one means by which pre-service teachers can be assessed.

Much of the interest in portfolio development is now focused on the use of electronic portfolios (Barrett, 1999, 2001; Read & Cafolla, 1999). Electronic portfolios offer several advantages compared to their paper-based analogs, including: reduced storage demands, ease of back-up, portability, ability to create links, and development of students' own technology skills (Barrett, 2001). In the context of developing pre-service teachers' own technology skills, electronic portfolios have the potential to help address the shortcomings of teacher preparation with regard to the use of technology that have been noted in a number of national reports (e.g., Moursand & Bielefeldt, 1999).

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Purdue Electronic Portfolio System

Purdue University's School of Education is now implementing restructured elementary and secondary teacher education programs. These new programs feature a cohesive set of courses anchored by four strands – technology, diversity, field experience, and portfolio assessment. Purdue's PT3 implementation grant, entitled P3T3: Purdue Program for Preparing Tomorrow's Teachers to use Technology, is helping to support the implementation of these new programs. One P3T3 initiative is the development of a dynamic assessment system that provides pre-service teachers the tools and opportunities to select multiple ways of viewing their evolving teaching practice, reflect on that practice, and use digital representations to meet performance-based assessments. This large-scale customized electronic portfolio system is designed to accommodate the approximately 2300 students in teacher education, and provide for reasonable consistency in how students and faculty deal with portfolios. The Purdue Electronic Portfolio (PEP) system consists of a database developed using Microsoft's SQL Server, a popular web-based database engine. Access to the database is provided through web pages that use Microsoft's Active Server Pages (ASP) technology. This allows for dynamic interaction with the database through a simple-to-use web front end that is familiar to users. The entire system is hosted on an in-house server with nearly two terabytes of storage space, enough to give each user the equivalent of a CD-ROM's worth of personal storage.

Students can use the system to upload files and create artifacts. In our parlance, an artifact is a collection of files that the student assembles in the e-portfolio system to address teaching proficiency. Students may classify artifacts according to three broad locally-developed themes as well as the ten INTASC principles that undergird many teacher preparation standards. To display the artifact, the PEP system features a template system that allows students to integrate a reflective narrative with links to various files that relate to a specific artifact (e.g., a written lesson plan, course assignment guidelines, a digital photo or even video of the lesson being taught). The templates provide flexibility in determining how the artifact will look, while providing consistency and ease-of-use. Once completed, the artifact is "published" as a web page with links to the integrated files. Initial pilot testing of the PEP system began in the fall of 2001 with about 400 students in Block I of the teacher preparation program. Results indicate the system provides the necessary functionality for student portfolio creation. The system may provide a model for other teacher education institutions interested in electronic portfolios. For more information, visit our website at: http://p3t3.soe.purdue.edu.

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Acknowledgements

The contents of this paper were developed under a grant from the U. S. Department of Education. However, those contents do not necessarily represent the policy of the Department of Education, and you should not assume endorsement by the Federal Government.

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Reflection as the Foundation for E-Portfolios

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Abstract: This paper describes a process used to guide written reflections used for entries in technology portfolios that are required for teacher licensure in North Carolina. While supporting artifacts are important evidence of meeting ISTE's technology standards for teachers (NETS-T), we believe the focus of our electronic technology portfolios should be on our preservice teachers' ability to reflect about their personal and professional uses of technology for teaching and learning. This paper includes an example of an entry from our model electronic portfolio that clearly delineates all the steps of *The Reflection Cycle*: selection, description, analysis, appraisal, and transformation.

Introduction

Reflection is a highly valued attribute of effective teachers (Henderson, 1996; LaBoskey, 1994; Lyons, 1998; Ross, Johnson & Smith, 1992; Zeichner & Liston, 1987). Without the disposition to reflect on their performance, teachers are less likely to improve their practice or to be able to see the links between theory and practice. While some research states that only 20% of teachers are naturally reflective (LaBoskey, 1994), we believe that this habit of mind is so important that we must try to teach all prospective teachers how to reflect on their practice. One way we do this is to use a specific model of reflection with our preservice teachers while they are developing their teaching and technology portfolios.

In our teacher education programs at The University of North Carolina at Greensboro (UNCG), we provide many opportunities for reflective writing including response journals, electronic discussions, self-assessments, and peer coaching. We also explicitly teach a process for reflective writing in our elementary education program and emphasize this practice while our teacher candidates are gathering evidence for their technology portfolios. Reflective thinking and reflective writing are required in our curriculum, but we focus on developing these skills during the preparation of technology portfolios that are required for initial licensure of every teacher in North Carolina. In our post-baccalaureate elementary teacher education program, we also focus heavily on reflective writing, as these students must prepare an integrated teaching and technology portfolio as a requirement for the Masters degree. Another incentive for teaching our students a specific process of reflective thinking is that the state of North Carolina requires initially-licensed teachers to prepare a performance-based (PBL) product, which is essentially a teaching portfolio, in order to obtain a professional teaching license. In an effort to help our prospective teachers be successful in developing their PBL product, we begin teaching them a specific process for reflective writing using *The Reflection Cycle* (see Figure 1) during their preservice teacher education program. We hope that this process has heuristic value for our students as they move into their chosen profession, so that they will think reflectively about their students' learning, the curriculum, and their teaching practices.

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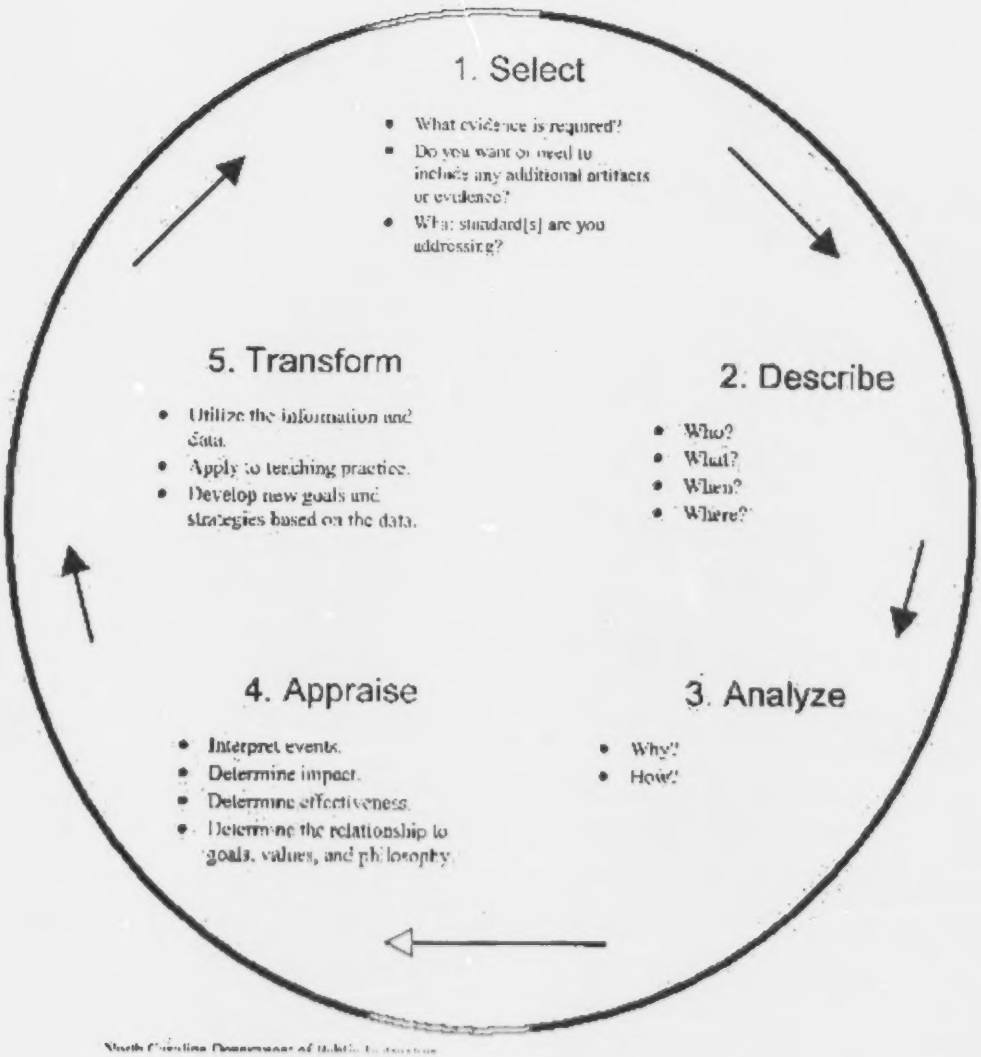

Figure 1. The Reflection Cycle
Source: NC Department of Public Instruction
http://www.ncpublicschools.org/pbl/pblreflect.htm

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Integrated teaching and technology e-portfolios

While some teacher education programs at UNCG require separate technology portfolios, most require teaching portfolios with technology integrated throughout them. Technology and teaching portfolios emphasize reflection that requires descriptive, analytical, and transformative writing about the evidence presented in these portfolios. Although our portfolios are organized around standards, including the ISTE NETS-T and the INTASC standards (or our state's Advanced Competencies for Master Teachers for M.Ed candidates), our prospective teachers are asked to use *The Reflection Cycle* to justify how their artifacts meet each standard. The overall goal of this focus on reflection is to foster understanding of how technology will impact teaching and student learning. We find that pushing our preservice teachers to go beyond describing the evidence in their portfolios to analyzing and appraising it, and then to thinking about how it transforms their practice, requires a concerted effort on their part and ours.

Recently we have begun the process of moving from print to electronic portfolios that integrate teaching and technology standards, following models developed by Helen Barrett of the University of Alaska. However, our version of e-portfolios continues to emphasize reflection and use of *The Reflection Cycle*. In fact, we spend as much time helping students learn to reflect on how they can use technology to promote student learning as we spend on refining their own technology competencies as professional educators. As our preservice teachers begin collecting evidence to demonstrate mastery of the NETS-T and INTASC standards, they simultaneously learn and practice their reflective thinking and writing skills. Evaluation of their eportfolios is based mainly on their success in using *The Reflection Cycle* to (a) describe each entry, (b) analyze why and how their evidence meets a particular standard, (c) appraise their evidence against their effectiveness for teaching and learning, as well as against the goals, values, and philosophy of the standards, and (d) write transformative statements about how the evidence applies to their teaching practice and how they will do things differently in the future.

Scaffolding reflective writing

Among the supports we provide our preservice teachers as they learn to use *The Reflection Cycle* are examples of reflective writing based on this model. We provide both good and poor models of reflective essays so that our preservice teachers can identify elements of *The Reflection Cycle* in examples that are well-written and those that need revisions, or may even have essential elements missing from the examples. We follow this with written feedback on drafts of reflective essays submitted with supporting evidence, which will eventually go into their teaching/technology portfolios. We also provide opportunities for peer coaching and peer feedback when at least half of the preservice teachers have become adept at using *The Reflection Cycle*.

The following example, which is taken from the model Teaching/Technology E-Portfolio that we have online at http://www.uncg.edu/soe/affiliates/teachers_academy/e_portfolio/main.html, actually has the parts of *The Reflection Cycle* labeled, so that readers can easily see the selection, description, analysis, appraisal, and transformative sections of the reflective essay. This example meets NETS-T #6 (*Teachers understand the social, ethical, legal, and human issues surrounding the use of technology in PK-12 schools and apply those principles in practice.*), as well as INTASC principles # 9 (*The teacher is a reflective practitioner who continually evaluates the effects of his/her choices and actions on others (students, parents, and other professionals in the learning community) and who actively seeks out opportunities to grow professionally.)* and #10 (*The teacher fosters relationships with school colleagues, parents, and agencies in the larger community to support students' learning and well-being.)*. In fact, in the e-portfolio, standards that are indicated in parentheses are hyperlinked to copies of these standards. There are also hyperlinks to specific artifacts that provide supporting evidence for the reflection, such as the PowerPoint slideshow discussed in this example.

Example of Reflective Portfolio Entry about Social, Legal, Ethical, and Human Issues (ISTE-NETS-T #6)

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Select: I developed and facilitated a PowerPoint presentation for parents and teachers at a PTA meeting at Verifine Elementary School (INTASC #9, #10). The presentation was about social, ethical, legal, and human issues with respect to technology use (NETS-T#6).

Describe: During my presentation (see Artifact #1-PowerPoint slideshow) we discussed how to protect one's privacy while using the Internet. We identified problems and dangers that students might encounter when using the Internet and I demonstrated the filtering software that we use at Verifine School (see Artifact #2 – link to information about filtering software). Then we brainstormed rules that students would follow when they are online to avoid these problems (INTASC #10). Next, I explained the Acceptable Use Policy (AUP) at Verifine School (see Artifact #3 – copy of AUP). Each parent received a copy of the policy to discuss with their child before signing and returning it. (NETS-T #6, INTASC #10). Next we examined equity issues around technology. I shared statistics demonstrating gender inequity with regard to computer technology (NETS #6). We brainstormed strategies that students can use to recognize bias in materials. We also discussed some of the things that students need to consider when collaborating on projects, especially computer-based projects. We discussed what students and parents need to know when evaluating the authenticity of material found on the Internet. Finally, we talked a lot about copyright issues, especially how it relates to electronic material and how the "fair use" policy is used by educators (Artifact #4-link to copyright information).

Analyze: I think parents and teachers learned a lot from the presentation. I am also confident that they will share this information with their children and model responsible ethical and legal decision-making concerning technology (INTASC #9, #10, NETS-T #6). I found that my presentation was aided greatly by my use of technology (INTASC #9). Using PowerPoint helped me organize my presentation into a series of slides that contained talking points. As I facilitated the presentation and ensuing discussions, the slides kept me focused without having to look at my notes.

Appraise: I realized that parents are receptive to learning new things about educational uses of technology. They were glad to hear more about our AUP and to know that we are teaching how to use the Internet responsibly (INTASC #10). I believe that PowerPoint was an effective use of technology because it created a bright and appealing visual aid that kept the audience focused.

Transform: If I were to do this presentation again I would definitely use PowerPoint, but I would change two things. The first thing is that I would invite parents and students to come to the meeting together. The presentation is appropriate for children and they would have also learned a great deal. I think this would be a great opportunity for parents and children to learn something together (INTASC #10). The next thing I would change would be to include specific scenarios that deal with social, legal, ethical, and human issues around technology (Artifact #5-example of scenario about piracy). I think such examples would make the presentation more interesting and the content more understandable for the learner (INTASC #9, NETS-T #6). In the future, I also plan to make use of PowerPoint in the classroom because the visual nature of the slides will help some students stay on task and the organizational schema will help students understand and remember material – especially my visual learners.

Progress toward reflective thinking in e-portfolios

We believe the quality of our teaching/technology portfolios has improved over the five years we have required them. Such improvement seems to be commensurate with the focus we have placed on integrating the reflective cycle into our professional courses. By the time our prospective teachers graduate, reflecting seems to be a natural process and, hopefully, is one habit of mind they will take not only into their induction period, but throughout their teaching career. As we evaluate this year's teaching/technology portfolios we will continue to refine our efforts to support prospective teachers as they learn to reflect about their practice and about their students' learning. We feel that they have made progress during the past five years, but we will continue to strive to help our students develop into reflective practitioners.

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Acknowledgements

Many of our ideas about electronic portfolios were developed while participating in SEIR-TEC's (SouthEast Initiatives Regional Technology in Education Consortium) SUNRAY Catalyst Grant funded by the US Department of education: Preparing Tomorrow's Teachers to Use technology (PT3).

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A WEB Based Electronic Portfolio System for Tracking, Assessing and Displaying Candidate Performance

Leroy Metze and Mark Pitcock

Western Kentucky University's College of Education and Behavioral Sciences has received an Innovation Challenge Grant from the United States Department of Education. The project, called e-train express, will implement programs and strategies that increase the number and quality of new teachers who are highly effective in using technology to facilitate, assess and communicate learning for all students.

Since only 20% of current teachers feel comfortable using technology in their classrooms and over two million new technology proficient teachers will be needed in the next decade, Western Kentucky University (WKU), along with partner schools [schools in the 28 districts of the Green River Regional Educational Cooperative (GRREC)], the Compass Learning Corporation and NetTango are implementing programs and practices designed:

- To ensure that all teachers who graduate from our teacher education program can use technology to increase student achievement;
- To ensure that all graduates can use technology to assess student learning;
- To ensure that all university faculty from both teacher education and the arts and sciences departments can model effective technology-assisted instruction for prospective teachers;
- To ensure that electronic portfolios are used as the primary means of gathering data used in the evaluation of teacher performance;
- To use technology to show K-12 students that teaching is a good career option; and
- To set up an electronic clearinghouse that will give teachers and teacher educators throughout the country access to exemplary technology-assisted lesson plans and assessments.

Western Kentucky University believes that technology has the potential to make teaching and learning far more efficient than in the past. Technology not only gives people access to new information, it gives them more opportunities to work together. The e-train express will enable WKU to integrate technology in teacher preparation courses and use technology to spread the best practices that develop from them.

During the first year of the e-train project the focus has been on two areas: Ensuring that all university faculty from both teacher education and the arts and sciences departments can model effective technology-assisted instruction for prospective teachers and establishing and using an electronic portfolio system for tracking, assessing and displaying candidate performance and assessing our program. This paper focuses on the development and use of our electronic portfolio system.

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This paper describes:

- The process of developing critical performances for every course taken by teacher candidates in teacher preparation courses and courses in the arts and sciences:
- The process of developing scoring rubrics for these performances;
- The development of a web based electronic portfolio system for tracking candidate behaviors related to each critical performance;
- The development an assessment system for evaluating candidate work using the electronic portfolio system;
- The development of a process for making selected student work available for perspective employers and others to view;
- The development of a procedure for assessing our program using data from the electronic portfolio system; and
- The process that has been developed for other colleges and universities to share our system.

For more information about e-train express, please see www.etrainexpress.com.

Development of Digital Portfolios in a Outcomes Based Curriculum

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Zayed University is located in the Gulf Region in the United Arab Emirates. It is a 3 year old all female institution providing undegraduate education in an outcome based curriculum.

This year, the university will graduate it's first ever class. All students are required to create a digital portfolio related to the published outcomes for each of the colleges.

Two departments are are involved in assisting Faculty in the development of these portfolios for students. Media Services and Information Technology.

This paper describes the start up issues of Media Services and IT and the training required for Faculty to allow them to be technologically competent to assist student in the development of digital portolios.

As the institution moves towards digital portfolios for students, several key factors have been indentified as requirements including the level of technology competence for Faculty and the availability of production facilities.

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Electronic Portfolios in Teacher Education: From Design to Implementation

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Abstract: In this session, we share results of our second year of electronic portfolio design and implementation. We highlight the pedagogical and programmatic considerations that have emerged from the portfolio models. Suggestions for other institutions who are considering electronic portfolios centered on reflection and performance based artifacts will be shared. Our presentation includes specific portfolios representing various licensure areas.

Background

Due do concomitant national and international teacher education initiatives, namely performance based assessment and educational technologies for teaching and learning, the implementation of electronic or digital portfolios as a major means of assessment is growing. By June 2002, our university is mandated to have a performance-based Unit Assessment Plan (UAS) in place. Our institution has identified student electronic portfolios as one performance assessment instrument for demonstration of multiple competencies. Engaging in the electronic portfolio process will also help students to develop technology-related knowledge and skills.

Our portfolio model includes a focus on student reflection and performance-based artifacts. Given the longitudinal nature of the student portfolio, reflection will become more rich and complex as students continue in the program. Students use course assignments along with outside experiences as potential artifacts to demonstrate competency in the INTASC and state standards. Building with their first education course through student teaching and induction years, candidates will offer an evolving portrait of their growth as prospective teachers supported by hyperlinked artifacts that demonstrate and exemplify this reflective development and competency.

Preliminary Findings

We highlight only two issues from our on-going analysis for promoting reflection and demonstrating competency in electronic portfolio environments.

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Reflection

The anticipated level of reflection was not apparent in the students' electronic portfolios. Even though the students were told that their portfolio was a place to process, the students did not want or feel comfortable reflecting on highly personal or ambiguous issues in a web-based format. One student shared that the *gloss* of a web page forced her to write in a way that appeared as "finished" and "clean". In addition, the reflections are mainly text-based as students made limited use of hypertextual language structures and almost no use of other digital media. Students reported a lack of experience across their curriculum with writing in electronic hypertextual environments. The quality and depth of reflection in the oral portfolio presentation however, was far greater than the students' written text. The ability to reflect orally in presentation format and in interactions with instructors and peers holds great promise for capturing rich reflection

Artifact Choice and Justification

The artifact choice in a portfolio may well be one of its most important components. In our portfolio model, the artifact is matched to a standard and is meant to document current competency. Equally important is the artifact *rationale* in which students articulate their justification for inclusion in relation to a particular standard. The rationale is meant to make implicit and explicit connections for the student as well as for the reader. Students were to 1) explain *why* the artifact was filed under a particular standard, 2) describe *how* the artifact fits into a student's growing competency, and 3) explain their strengths and weaknesses in relation to a particular standard.

Many students struggled with a coherent fit between the standard, the artifact, and the rationale. This was more prevalent with freshmen that were just becoming familiar with the various standards while trying to learn the technology and make decisions about appropriate artifacts. Upperclassmen who already had working knowledge of the various standards were better able to choose and create appropriate rationales for artifacts. This discrepancy may also be influenced by the wealth of potential artifacts that the older students had available to select from, as well as their confidence in their knowledge and ability to justify their progress in their degree program. For many however,the rationale and artifact were treated as isolated items with little relation to each other. It will take time in the program to teach students how to "think" about their work in portfolio terms.

Significance

Increasing numbers of universities moving to electronic portfolios will require university educators to provide assistance in the process of deep reflection and performance-based competency in this new medium of representation. While our data are not generalizable to other contexts, the issues raised here may alert others to similar areas of concern. One potential danger lies in the treatment of knowledge as superficial and "thin" at a time when the concept of knowledge as constructed and dynamic in nature persists. In an attempt to infuse technologies into the teaching and learning process for preservice students, we may inadvertently misdirect our students in terms of representing knowledge growth. Our initial work demonstrates the importance of the purpose of alternative assessment method as capable of capturing long term process and alternative representations of knowledge.

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Data from this study suggest that researchers in this area may need to explore new methods of collecting reflection as it appears in new hypertextual and hypermedia forms. These data also suggest that instructors must teach students how to explicitly make the connections between artifacts and meaning-making rationale. The way in which we ask preservice students to verbalize abstract, complex, possibly ethereal, and certainly fragile understandings of the learning to teach process affects *what* and *how* they tell us. If language creates a particular view of reality and of the self, we need to investigate how language and meaning are mediated by digital environments. Van Manen (1990) raises the issue of the epistemology of language and text when he states:

> We must not forget that human actions and experiences are precisely that: actions and experiences. To reduce the whole word to text and to treat all experience textually is to be forgetful of the metaphoric origin of one's methodology (p. 39).

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The Model of a Teacher's Electronic Portfolio: Enhancing Instructional Planning

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Abstract: The purpose of the short study is to suggest how a teacher's class web site, as an electronic portfolio, can be efficiently designed for instructional planning. The findings guide a teacher to avoid haphazard web site designing. Specifically, the suggested model of a class web site covers the sections of a teacher's biography and course information.

Introduction

Teachers have used various types of technical skills and products such as web sites, multi-media presentations, educational videos, and so forth to facilitate learners' achievements (Shuell & Farber, 2001). Upon finishing a particular lesson, a teacher usually starts to evaluate students' results or productive outcomes in several ways. Students who actively participate tend to have a stronger learning experience through integrated instructional technology (Fischer, 1996).

An electronic portfolio has become a new method for faculty's assessment of student's lesson outcomes and even for pre-service teacher education (Read & Cafolla, 1999). Furthermore, teachers have used their own electronic portfolios as a supporting instructional resource. However, there are some aspects to be critically considered for designing efficient faculty's class web sites. With respect to sections on a class web site, one can differentiate, customize, and develop his and her class web site that stores text, photos, and graphics; even pictures on a class web site produce diverse meanings upon viewing (Zammit, 2000).

According to the study of Lankes (1995), there are several types of electronic portfolios: Teacher planning, proficiency, showcase, employment skills, and college admission. The electronic portfolio as a class web site is based on the perspective of a teacher-planning portfolio.

Using the suggested model of faculty's web site (Ruffini, 2000) is to serve for a teacher's electronic portfolio. Ruffini's model has three main sections: Biography, course information, and publications. Those are critical for portfolio development, which demands several developing stages such as collecting, inspecting, purpose and audience, and so forth (Barrett, 2000).

Advantages of an electronic portfolio as a class web site

Electronic communications in schools have created opportunities for teachers to interact with their students quickly without limitation of time and location. In order to have this advantage, teachers and students need to have computers, printers, fax machines, and other equipment for various communication ways. Among these, a teacher's electronic portfolio serves as a class web site that gives students more convenient access to updated information and better understanding about the class. The teacher's class web site becomes the storage of students' completed projects, allowing other students see what classmates have produced for each project. In comparing others' works on a teacher's electronic portfolio as a class web site, students can do the following:

- Improve her/his productivity, Adjust new information to one's learning strategy, Have answers to questions via updated information, Create and innovate new idea, Raise critical comments in group activities, Improve access-quality beyond the limitation of time and location

A class web site at schools becomes not only a collection of a student's work, which demonstrates her/his skills and achievements in projects or activities, but also a class electronic bulletin board, which posts class schedules, current students' activities, students' personal directory, an upcoming assignment information, and so on. Among models suggested by Lankes (1995), the teacher planning electronic portfolio is used as a class web site and a collection of students' accomplishment. A teacher may use an electronic portfolio to receive information about incoming students in order to effectively plan both a class curriculum and instructional design and strategy. As a result, the teacher may have an idea of the level of knowledge and employ the electronic portfolios as a pre-assessment for classes before a class starts.

A teacher may store a sample of an assignment while students start to create an assignment. For example, if assigning the creation of the timeline of American Civil War in Florida in a social studies class, a teacher may post several sample works in order to give students in and out of a class better understanding of format and components. In viewing these samples, students are able to consider what they need for a project and to provide sufficient information for specific events in American Civil War in Florida. Furthermore, students in a group activity can communicate with group members and discuss their projects via an electronic bulletin board in a class web site.

Suggested factors in a class web site

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In designing a class web site, a researcher found that employing systematic approaches will help prevent a haphazard web site because an ill-planned web site may cause students to be confused and distracted when they attempt to retrieve information (Ruffini, 2000).

To design an effective class web site, a teacher may include the following factors:

- Target Audiences, Objectives, Contents, Page Design and Structure

In terms of appropriate level of instruction, a teacher should consider pre-requisite skills and knowledge, learners' current levels of knowledge, and predicted objective outcomes. In considering these factors, the teacher can design a class web site that is user-friendly accessible and appropriate for the incoming students. When a teacher designs a class web site, the teacher should ensure that the information included for students is consistent with instructional objectives. Several reasons to have the class web site consistent are; it reduces vagueness of instructional objectives, emphasizes the purposes of the class, and clarifies the information required for assignments, projects, and class preparations. With respect to contents, accurate information is critical to make a class web site a relevant information resource. Inaccuracies in the content of the class web site may misguide students.

Zammit's research on graphic icons (2000) shows that "pictures and graphics are more likely to be seen by different users in different ways than would chunks of text" (p.217). Due to that, a teacher should, upon planning and designing, consider user readability. It would be difficult to satisfy all students' comprehension of information provided in a class web site. However, as long as the class web site is not e-commerce web sites, which are typically long and complex, a teacher may be able to create and maintain an unequivocal class web site. When applying these ideas, a class web site serves as a teacher's electronic portfolio and may include several sections: Instructor's background, information for the class, and a collection of students' products; each section may also have several sub-sections.

Conclusion and Discussion

"E-mail is used to facilitate communication among students or between the instructor and students; and electronic discussion boards and liaison are used to expand classroom discussion" (Shuell & Farber, 2001, p.119). Other than e-mailing, some of the valuable ways in which electronic portfolios can be used are: Posting outcomes of students' learning, management of teachers' instructional strategies, and storing and supporting academic information by school library media specialists. The electronic portfolios can be designed systematically in order to facilitate maximum functions with respect to delivering and storing information. If a teacher cannot store or manage many students' electronic portfolios due to capacity of file volumes and computer system, media specialists should manage such huge portfolios for most teachers and students in a school media center (McDonald, 1997). There are issues concerning the collaboration between a teacher and a media specialist in meeting instructional needs of students' electronic outcomes.

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Year Two of the Electronic Portfolio Project at the University of Florida

Gail Ring, University of Florida, US

Abstract In this session I will report the results of the first year of implementation of the electronic portfolio project in the College of Education at the University of Florida. I will address the successes of the project as well as project weaknesses.

Background

The college of education at the University of Florida has completed its first full year of implementation of the Electronic Portfolio Project in which all preservice teachers are required to develop, publish, and maintain electronic teaching portfolios. During this first year we have learned what contributes to the success of such a program as well as what impedes its success.

The Purpose

All students majoring in Early Elementary Education, Elementary Education, and Secondary Education at the University of Florida are required to develop and maintain an electronic teaching portfolio. The purposes of the portfolio are to:

- present illustrations of competency in the 12 Florida Accomplished Practices;
- promote the use and integration of technology in the educational experience at UF;
- promote the development of a professional vita;
- provide a forum for connecting a student's university experience to personal and professional insights;
- provide a better understanding of professional requirements for certification beyond the University of Florida, i.e., National Board Certification.

In addition, our students have come up with different ways to use their portfolios. For example, some students use(d) their portfolio as a teaching tool, others as a way to push themselves to learn more about innovative uses of technology.

Strengths of the program

The Electronic Portfolio Program has enabled the college to involve students in their education. Students have commented that throughout their program they were often just taking classes, not really thinking about what it was they were learning. More than one student noted that the development of the portfolio enabled them to step back from their assignments and reflect on what they were learning and its relevance to their teaching. Student comments such as: "After I began to work on my portfolio and put all the elements together, I began to see that I really had learned a lot!" reiterate that reflection is a necessary element of the portfolio development process.

Weaknesses of the Program

The first year taught us a great deal about the implementation of a college-wide innovation. We learned that the success of the project is directly correlated to the level of classroom integration. In other words if the faculty don't actively support the project the students are often going to feel that it is an add on and will go away, or that no one will look at the portfolios so they can be put together quickly at the end of the semester.

Student Benefits

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The e-portfolio was designed as way to encourage students to make connections between the theories they are learning in their courses, their assignments, and the authentic experiences they have in their field work. In addition, developing a web-based portfolio of their work enables students to learn how to use and integrate technology throughout their graduate program. This provides our students with technological fluency. In addition, through their reflective (rationale) statements students provide tangible evidence that they have a clear understanding of the Florida Accomplished Practices.

Programmatic Benefits

The portfolio project is part of an intensive change effort at the college, and as such has the potential to impact the curriculum, level of technology integration, and evaluation. Change, however, is rarely easy and not embraced quickly and evenly. Although many professors had little involvement with the portfolio project in the first year, by the second year, many are beginning to discuss portfolios with their students and seeking ways to integrate the electronic portfolio project in their courses. In addition, many professors who have not previously used technology in their teaching are taking advantage of the faculty development opportunities available to them in the college.

Future Directions

As we proceed with the project we continue to have many questions about portfolio development such as: What factors in the development process contribute to richer student learning? How will developing a portfolio contribute to students' ability to reflect about their own work and their own progress? How does developing a portfolio contribute to the students' perceptions of themselves and their own abilities? As we continue to work with our students and their portfolio development, we hope to address these issues.

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The Good, The Bad, & The Ugly: lessons learned from electronic portfolio implementation

Ann Rose, West Liberty State College, US

At the SITE 2001 Conference, we were inspired by the work being done with electronic portfolios. Returning to campus, we knew that this was something we wanted to do. It fit so nicely with what we had heard about the new NCATE guidelines. So, during the past year, West Liberty State College, a small 4-year state institution in northern West Virginia, undertook the challenge to move to performance-based assessment and electronic portfolios within the Professional Education Department. As a result, over 900 of the institutions 2500 students are now creating electronic portfolios for student and program assessments.

This decision was not made quickly or lightly and reflects our commitment to remain aligned with the new NCATE guidelines and the NETStandards. Through the development and implementation of our plans, we learned many lessons that should be valuable to any other institution considering a similar program. Our faculty required education on portfolios and performance-based assessment before we could begin discussing portfolios, electronic portfolios, or artifacts and structures. This lead to an enlightenment that perhaps some very tried, if not true, teaching methods might need to change. We conducted workshops and in-services in addition to one-to-one mentoring sessions. In addition to motivation for the common good of our students, we are approaching an NCATE review next year.

Once a commitment to portfolios was formalized, albeit some reluctance, a committee was formed to make a proposal. The format was determined to be electronic with a meshing of our NCATE Conceptual Framework and the INTASC Standards. Students would be required to select two artifacts to support each standard and provide a written reflection offering (1) a description of the artifact, (2) a statement relating how the artifact demonstrates work related to that standard, and (3) a personal reflection of future growth goals in this area. Additionally, each portfolio would include a personal statement/resume, a philosophy of education, and any additional information the student wished to include. Finally, it was decided that the portfolio would be conceptually introduced in the first education course, *Introduction to Education* and the technological mechanics would be addressed in the first technology course.

The second hurdle was the decision of how to "use" the portfolios. The department agreed that this should be an assessment portfolio demonstrating breadth, depth, and growth on the part of student. A comprehensive rubric was developed and a decision made to assess the student reflections rather than the specific content of each artifact. As a result, we back peddled and decided that each and every EDUC, READ or SPED course would include multiple assignments that would be designated as "potential" portfolio items. Each assignment should be performance-based and assessed within the course where it was assigned. The instructor of each course would be required to assess the assignment and give a course grade. From this collection of "potential" portfolio assignments, the student then selected the items for reflection and inclusion within the portfolio. The initial evaluation of the portfolio would be at the time of formal application to the Education Program. This usually occurs after approximately 60 credit hours. A committee of two faculty members would review each portfolio in conjunction with other admittance criteria.

The second assessment would occur midway through the professional/student teaching semester. At this time, the portfolio would be assessed to determine how the student demonstrated mastery of each of the standards. Again, a rubric was developed to guide a committee of three faculty members. Scores for each standard were noted and used to determine weaknesses in our program and courses. Students received an unacceptable, developing, acceptable, or exemplary rating. Feedback from this assessment is used for program modifications and department decisions.

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One of the most challenging decisions was to use an electronic format. Several faculty were not comfortable with this idea. Unfortunately, these people are not comfortable with much of the technology available today and reflect many of the skills still found in our local schools. For this purpose, it became necessary to select a platform that was advanced enough to provide a comprehensive picture of the candidate's knowledge, skill and attitude yet still be consistent with what might be useful for future purposes (i.e. interviewing). We chose to build web-based portfolios with electronic documents, scanned documents and images, digital photos, video clips, and audio clips. Students were encouraged to link PowerPoint presentations, Web Quests and other projects as artifacts.

We have worked on this for one year and now know what we did right and what we did wrong. Our first set of portfolios has helped us to see what we should have considered. The largest problems we are facing are reluctant students and overworked faculty members. The students don't see the value/need for these. They are very comfortable with the tried and true lecture to me and then give me two tests model. Many are kicking and screaming about a shift to performance-based assessment. Yes, it is more work for them; and for us, the faculty, too. The faculty found more work than expected in designing, developing and grading these portfolio assignments. Faculty had the additional burden of assessing the portfolios. Let's see... 90 student teachers with 3 evaluators each means 270 assessments divided among 12 faculty members who don't all do share. Sound familiar? This was the ugly part!

The actual portfolio results have been both good and bad. Some are disappointing. Others made it all worthwhile. The elementary students have more motivation but sometimes lacked the depth of reflection or technical skills. Some of the secondary students really showed their expertise and have portfolios on CDs that will certainly open many job doors. Some others, often by major, are less satisfactory. For us, we will continue and hope that we can grow from our lessons learned. Perhaps, our lessons learned will help you too.

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Promoting Paperless Portfolios as Assessment in Graduate Level TESOL Programs

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Abstract: This article describes curriculum and course design innovations for electronic portfolios used as a final evaluation in a graduate level TESOL program. Components of this portfolio are authentic documentation of the abilities mastered by the inservice teacher during the course of graduate study. The highlighted components, among others, are compiled into an electronic portfolio, making use of a multi-media format (i.e., digitized video clips, tape recordings, photographs) in a PowerPoint presentation.

The use of portfolios as a means of authentic assessment and evaluation has become increasingly popular in undergraduate as well as graduate programs (Tellez, 1996). Graduate programs often make use of portfolios in place of traditional comprehensive exams as final student evaluation. As technology becomes the norm in all areas of education, such evaluation portfolios are becoming paperless. Recent research indicates that paperless portfolios in graduate programs have distinct advantages over other conventional forms of assessment, such as the traditional portfolio or comprehensive exam (Jackson, 2000; Swain & Ring, 2000). Benefits of electronic portfolio assessment are demonstrated both in terms of authentic student evaluation and in students' ongoing use of technology in their practical and professional endeavors. This presentation describes an electronic portfolio evaluation being developed for teachers in a graduate level TESOL program. While the concept of the paperless portfolio is well founded in the literature, the design is innovative.

The context for this qualitative study is a Teaching English to Speakers of Other Languages (TESOL) Master's degree program at a large university in the United States, whose participants include beginning and veteran teachers. This presentation includes a description of components of the electronic portfolio based on core course work, the ESL Standards for Pre-K—12 Students (TESOL, 1997), Preprofessional Competencies for Teachers of the Twenty-First Century (Florida Education Standards Commission, 2000), and National Board Certification Standards (National Board for Professional Teaching Standards, 2001). The portfolio contents are assembled by the program participants during the year-long program of study for the Master's Degree. The skills acquired by participants will be beneficial in promoting technological expertise.

An innovative twist to this portfolio design is the integration of the components across the program curriculum. As we researched previously designed electronic portfolios and planned implementation of such a portfolio into our program, we noticed that components of many such portfolios were based on one specific set of standards, i.e., best teaching practices, with the student required to document competency in each area. Because teaching is such a complex and integrated field, we decided it would be a more authentic form of assessment to design components enabling teachers to demonstrate multiple competencies over time and across graduate courses. Our faculty collaborated to design portfolio components that integrate the objectives of several classes, and to re-design class projects in order to support these components. They worked to ensure that each exercise would be a truly authentic assessment of TESOL pedagogical practices. One component, for example, is a case study that integrates language assessment with knowledge of linguistic subsystems, knowledge of second language acquisition, and knowledge of TESOL theories and practices. Other features of

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this innovative electronic assessment include video clips of the students teaching, and student-designed internet-integrated curricula for K-12 students learning English as a second language.

The Linguistic Assessment Case Study component was the result of a brainstorming session of the TESOL faculty. It integrates material learned in four courses: Applied Linguistics, Language Assessment, First and Second Language Acquisition, and Theories and Practices in TESOL. It also integrates the TESOL Standards dealing with language and assessment, seven of the twelve "best" teaching practices and five of the twelve National Board Standards. When preparing this component of the portfolio, the student will implement an on-going authentic assessment of a learner with limited English proficiency (LEP) for one academic year. The learner's progress will be assessed through a collection of interlanguage samples. Progress will be scored using analytical rubrics and the assessor's knowledge of linguistic structures as they relate to these subsystems. The learner will be assessed in the areas of speaking, reading, writing and content areas. Second language acquisition will be assessed compared to the theoretical sequence of second language acquisition. TESOL theories and practices will aid the assessor in prescribing curricula for the learner based on the assessed needs.

The Integrated Webquest Unit integrates two TESOL standards, nine accomplished practices, and eleven National Board Standards. Using the combined knowledge of TESOL theories and practices, concepts in multi-cultural education, and curriculum design for LEP students, the student will design an integrated multi-media/web-based unit for second language learners.

Another opportunity to demonstrate knowledge and skills acquired throughout the program of study is the Practicum Portfolio. While working with an experienced ESOL teacher, the student will have the opportunity to observe and reflect on teaching practices, and to prepare and present lessons in the classroom. The Practicum Portfolio will be a collection of the lessons taught, reflections on teaching practices and issues in the LEP classroom, observations on lesson modification, and a collection of classroom students' work.

The implementation of each of these components, and other portfolio elements, requires the student to learn many technology skills. Students become proficient with PowerPoint software, video equipment, and scanning techniques, while creating the portfolio. While many teachers and students already have technical proficiency and use it in the classroom, there are many more who do not. By preparing this electronic portfolio, students are required to hone these skills in order to prepare a quality product.

While our electronic portfolio is still in the implementation phase, preliminary work by current graduate students has produced positive comments. The master's degree program is intense, lasting slightly over one calendar year, but students feel the benefits of the electronic portfolio far outweigh the extra work required to prepare it. They already predict the implementation of the portfolio will lead to better knowledge and understanding of the concepts for teaching ESOL students. The opportunity to put these concepts into practice works to strengthen the student's academic self-efficacy. These teachers expect to make use of the technology skills learned in this process in their own classrooms. Many have commented that they foresee the electronic portfolio as a useful tool in securing a teaching position in the TESOL field.

To summarize, this presentation showcases the innovative, integrated components of this TESOL Master's Degree electronic portfolio. In addition, we exhibit the usefulness of the paperless portfolio as an authentic, visual future reference for prospective employers. Finally, this presentation displays how the electronic portfolio assessment augments students' technological expertise, preparing them for the challenges of teaching diverse students in an increasingly high-tech classroom.

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Meeting Technology Competencies: The Digital Portfolio Approach

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Prospective employers and accreditation agencies expect preservice teachers to provide documentation of their work in education. Universities are moving from traditional scrapbook portfolios to digital portfolios (Aschermann, 1999). The traditional teacher portfolio is a collection of artifacts from course work and field experience in a three-ring binder (Louisiana Tech University, 1997). In contrast to the traditional portfolio, the digital portfolio is simple to update and makes distribution of multiple copies reasonable. The digital portfolio eliminates storage issues while providing preservice teachers with a powerful means of circulating their work (Polonoli, 2000). Preservice teachers who create digital portfolios enhance their technology skills and make themselves more marketable (Milman, 1999).

Recently, we received a PT3 grant to extend our "Viewing and Doing Technology" program into the elementary school blocks and our field-based faculty. Training sessions for the elementary faculty are held throughout the Fall and Spring semester conducted by faculty who have expertise in certain areas of technology. These new technology skills are in turn used by faculty to model and assign technology components in their classes. For a more complete description of the "Viewing and Doing Technology Project" please see our website http://www.ci.swt.edu/vdt/vdt.html. As part of the grant, the committee charged with setting the standards for the VDT program decided to begin a digital portfolio process for the preservice teachers in the elementary program. The digital portfolios will contain artifacts demonstrating the technology skills acquired during their course of study.

The following are several of the many questions we addressed in considering a digital portfolio showcasing the preservice teacher's technology competencies.

1. Which technology standards should be used? (ISTE, TEKS, INTASC, others)
2. Which should have prominence in the portfolio, the standards or the content (artifacts, reproductions, productions, and attestations)?
3. What format should the digital portfolio take? (web based, hyperstudio, pdf, PowerPoint)
4. Which web authoring program should be used? (FrontPage, Dreamweaver, Netscape Composer)
5. Should the portfolio be template driven or should students be allowed to create a portfolio from scratch?
6. How much time will it take for students to assemble the portfolio?
7. Should step-by-step instructions be developed to guide the student through the process?
8. What type of artifacts should be included?
9. Should the artifacts be in their native format (for example, a Publisher or PowerPoint document) or should they all be converted to pdf files?
10. How should artifacts be stored prior to being put in a digital portfolio? (floppies, zip disk, CD-RW)
11. How should the portfolio be distributed? (Web based or CD-R)
12. At what point in their professional program should students begin assembling their digital portfolio? (first semester, second, or third)
13. Organization: how should the standards be displayed or presented and linked to the teachers work?

This paper/presentation will discuss many of the questions posed above. The presentation—rather than repeating the printed material—will share the digital portfolio products created by students.

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Collect, Select and Reflect: Using the Electronic Portfolio in Teacher Preparation

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Traditionally artists used portfolios to demonstrate their work. More recently many artists have created websites to highlight their accomplishments, expand their client base, and increase opportunities for feedback from the art community. The education profession can reap great benefits from shifting from the three-ring binder scrapbook approach for portfolios to a web-based, standards-driven collaborative tool for both pre-service teacher preparation and professional development. The Electronic Portfolio developed by Center for Technology in Education at Johns Hopkins University offers a comprehensive view of a teacher's performance and potential. This web-based tool hosts selective collected works, interpretations of standards, professional development goals, educational philosophy, journal entries, resume, and the ability to gather feedback from throughout the education community.

Electronic Portfolios have the capability to increase professional growth, improve teacher quality, and ultimately raise student performance. Accessible anywhere users can get to the web the Electronic Portfolio becomes the teacher's online filing cabinet as they gather potential artifacts. Refinement of these resources involves reflection on the part of the teacher and collaboration with peers and advisors. Reflection is an integral part of the Electronic Portfolio as users seek to interpret program standards and integrate a solid foundation of subject matter expertise with the most current knowledge base on teaching and learning. Being electronic, users have the ability to request feedback from others on any element of their portfolio, without giving access to the entire portfolio. This allows users to craft their interpretations, rationales, reflections, and evidence without surrendering control of their portfolio.

Working with the nationally recognized traditional portfolio structure required in the Masters of Arts in Teaching Program at Hopkins as a foundation, the Center for Technology in Education has created this Electronic Portfolio application that allows teachers to analyze their own practices with the ease of an intuitive, web-based tool.
The Masters of Arts in Teaching Program has embraced this solution and now requires all MAT students to use the Electronic Portfolio to collect their evidence and present a finished portfolio to a review team. The review team also benefits from the move to an electronic portfolio conducting preliminary evaluation and scoring prior to a face-to-face presentation.

This presentation will highlight the functionality of this application developed by the Center for Technology in Education (CTE) and the reflective process conducted by the Masters of Arts in Teaching Program (JHU) to implement a program wide electronic solution. Participants will gain an understanding of the promise of Electronic Portfolios and their implementation across an entire program. The presentation (lecture-interactive) will start with an identification and honest appraisal of traditional portfolio programs followed by the goals set out for development of an Electronic Portfolio system. Hurdles such as faculty and student training and implementation will also be discussed.

In that any set of standards or principles can be entered into this application (ATE, INTASC, etc) presenters will use ISTE NETS to showcase the functionality of this tool.
Presenters include those who developed/coded the application, those who have implemented it across the MAT program, and MAT faculty to ensure a complete program team capable of engaging a wide audience on a number of levels. Presenters will demonstrate actual teacher portfolios, not just samples. A website explaining the Electronic Portfolio and offering a brief tour will be complete prior to the conference (www.cte.jhu.edu/epweb).

Participants need no prior knowledge of Electronic Portfolios.

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ELECTRONIC PORTFOLIOS ON A GRAND SCALE

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Abstract: A PT3 team discusses their trials, tribulations, and triumphs of implementing electronic portfolios at a larger teacher certification university with programs across several departments and colleges. The presentation will share the templates designed, training provided for implementation, and technology advancements and purchases dictated by the implementation.

With the move of NCATE toward a documentation developmental portfolio, many teacher education institutions are taking the process to a digital format. This makes a lot of sense considering the wider range of artifacts that can be included in a very compact archiving format. The ease of cross-referencing artifacts to multiple standards is another benefit. Over the last few years, we have attended many conference presentations on digital portfolios. We have gained much insight into format, style, and artifacts. However, we were often left wondering how to translate the information to our particular situation. Many of the presentations dealt with relatively small student populations and a few faculty members in the portfolio development process; but our institution is considerably larger with over 100 faculty and approximately 3000 teacher certification students. Our college has decided that electronic portfolios will be required as part of all teacher education programs. Students are required to have an electronic portfolio begun as part of their admission process to the teacher education program. Fall 2001 was the first year of this new admission requirement, so in three years ALL education majors will have developmental electronic portfolios. This paper will share the lessons learned though our last two years as we have begun the development and implementation of electronic portfolios. We will share information on the questions we asked and answered, the problems that occurred, and the team building that was necessary for a project this size.

Building Ownership

While the PT3 grant team had been charged with assisting with the implementation of the electronic portfolios, we knew that we could not infuse the portfolios across the entire teacher certification program by ourselves. Because the programs are distributed across multiple colleges on campus, we decided to use a built-in mechanism to assist with the implementation. The College of Education Associate Dean provides the central link for all the undergraduate teacher certification students across campus. His office is responsible for filling the applications with the State Department of Education. This Associate Dean established a Teacher Education Coordinating Council (TECC) that works on the unifying processes that are necessary to have conformity of

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requirements. In the past this council has dealt with such issues as student teaching evaluation forms, student teaching handbooks, and pre-student teaching meetings. This group seemed the logical place to begin.

The members of our PT3 team attended several meetings of TECC, explaining the expectations of NCATE and the potential of electronic formats. A committee was then formed from TECC and PT3 to work with the Assistant Dean to establish some standards for the electronic portfolios at IUP.

The Templates

The portfolio committee met several times debating questions such as: content that should be required of all students, what should be optional, confidentiality of information, what the expectations should be, rubrics, and formats. The student teachers had been required to make portfolios for several years; however, these were hiring portfolios created in their senior year. The requirements for these portfolios gave us a place to start with some of the content requirements. It was decided that all portfolios would include a resume, philosophy statement, health screenings, clearances, and transcripts. The final discussion was the inclusion of standards — Which ones? We had seen portfolios built on NCATE standards, ISTE standards, and INTASC standards. After some discussion, it was decided to use NCATE standards in our electronic portfolios. Members of the committee put together three different forms of the portfolio as examples to share with TECC: PowerPoint, HTML, and Word.

Templates were created that the students would be able to personalize, but the basic content would remain consistent. The templates began with a home page. This page included the name, contact information, major plus links to the resume, philosophy statement, health screenings, clearances, and transcript pages. A menu line is included on all the major pages of the templates allowing for easy navigation. Instructions on the pages tell the students to cut and paste information into the page or insert images of scanned documents.

The standards page becomes a little more involved. The NCATE standards can be rather lengthy to include all of them on one page, so the committee decided to abbreviate the standard statements on the initial page. When you click on an individual standard you are taken to another page that provides the entire standard statement. Students are then to include artifacts that illustrate their progress toward meeting the standard. We have established practices of reflective statements in our education programs, so this was continued into our electronic portfolios. The students are asked to reflect on the artifact attached to a statement, explaining why it is being used and what it says about their working toward the standard. Students are encouraged to use artifacts to illustrate multiple standards, which was difficult in a traditional portfolio.

Spreading the Word

One week long workshop on creating portfolios was offered during the summer. Faculty at this workshop were taught how to use Netscape Communicator and how to modify the templates. The foreign language faculty attending the workshop wanted to include their professional standards into the templates. The PT3 team assisted with this modification. During Fall 2001, the PT3 team offered a series of workshops focusing on implementing the portfolios. Workshop topics were: Using Netscape Communicator to Create Electronic Portfolios, Using MS FrontPage to Create Electronic Portfolios, Inserting Graphics into Electronic Portfolios, Adding Video to Electronic Portfolios, Adding Audio to Electronic Portfolios, Using a Digital Camera for Electronic Portfolio Artifacts, Incorporating Artifacts into Electronic Portfolios, and Burning CD's. Interest in portfolios began to increase as people began to see ways to utilize the portfolios in their individual courses. Handouts were created on each of these topics to enable faculty to review on their own and to reduce the amount of preparation time they would need to introduce portfolios in their own courses.

The PT3 team attended a meeting for the education faculty across campus looking at the upcoming NCATE review. The electronic portfolios were shared at this meeting. We offered to assist departments with the implementation. Subsequently, we attended a departmental meeting to share the portfolios and answer questions. The PT3 team worked with several departments, making nearly 20 visits to individual classes,

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modeling for faculty how the portfolios could be developed with students. The templates have been made available to students in classes, from internal servers, and our PT3 site (http://www.coe.iup.edu/PTTUT).

One faculty member, who had been a part of the TECC Portfolio Committee, began the semester utilizing portfolios with the students in her program. She has provided the PT3 team with much needed feedback on how the templates work and how we might improve the process. Similarly, by co-teaching classes with faculty, we gained feedback that was used to improve our templates and handouts.

During the semester break two separate workshops were offered. One day long workshop assisted faculty members in making example portfolios for their individual programs and courses. The second workshop encouraged departments to begin looking at the larger picture of where artifacts could be created and how their department would systematically integrate electronic portfolios.

Support for Student Portfolios

The College of Education and Educational Technology at Indiana University of Pennsylvania actively supports and assists the students as they develop their portfolios. Not only do we provide portfolio templates for our students and train our faculty how to teach the students the necessary computer skills to create their portfolios, but we also provide a special Portfolio File Server for students to use as a repository for their portfolio files. Each student is currently provided 40 megabytes of storage on the Portfolio File Server, and students can request more space if needed. Each student has a folder, identified with their user name, on our Portfolio File Server, and the access rights are set such that only the student has access to the folder and any files within the folder. The Portfolio File Server does not provide web access to student portfolios because of our concerns about confidentiality.

In addition to the Portfolio File Server provided by the College of Education and Educational Technology, the university provides additional special server storage space for students to share portions of their portfolio with their faculty on a Project Directory Server. The graphic below shows the folder structure of the Project Directory Server. Each semester, a folder for each course taught at the university is created on the Project Directory Server. Within each course folder, there is a folder for each section of the course. Within the section folder, there are several folders including a hand-in folder for students to submit assignments, an information folder where faculty can place files they wish to share with students, and a student folder for use by the students enrolled in the particular section of the course. Within the student folder, there is a separate folder for each student, and only the student and the faculty member teaching that section of the course have read and write access to the individual student folder. The student folder provides space for sharing files, including portions of their portfolio, with the faculty member teaching the course. Since only the students have access to their own personal folders on the Portfolio File Server, students can copy portfolio artifacts from the Portfolio File Server to their folders within a course section on the Project Directory Server where their faculty member can view the files.

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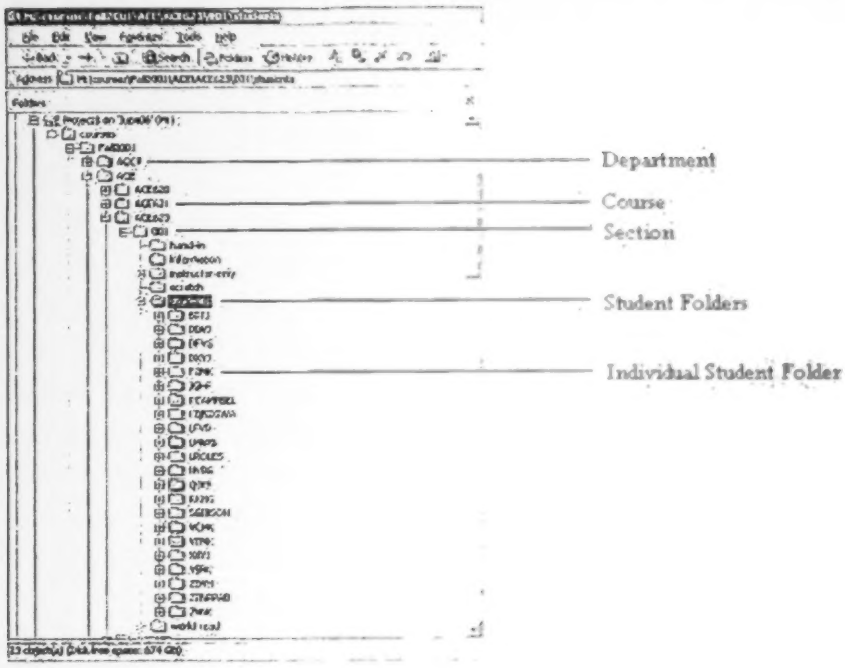

Figure 1: Project Directory Server File Structure

Since the Portfolio File server does not provide web access, if students wish to place part or all of their portfolio on a web server, we recommend that they use one of the many free web hosting sites or contact their Internet provider for web space.

Students can burn a copy of their portfolio to a CD when they need to share their portfolio with other people. We have provided multiple CD burners for this purpose in each lab within the College of Education and Educational Technology at the university. All of the computer labs within the college have scanners, CD burners, and web page development software.

The College of Education and Educational Technology has also created a Portfolio Studio where students can get additional instruction on using CD burners, scanners, digital cameras, video editing equipment, web page development software, and other helpful tools for portfolio development. A graduate assistant and practicum students are available in the Portfolio Studio to assist students and faculty.

Conclusion

While the integration of electronic portfolios is far from finished at our institution, we feel we have made great headway. There are still questions to be answered and hurdles to be overcome, but the departments are beginning to wrestle with them. For example, questions still remain on mechanisms for advisor review of portfolios at different stages of student progress through their programs, as well as on organizing the college portfolio server. Moreover, the PT3 team could not design each program's portfolio - that needs to be done internally. Nonetheless, the challenging task of creating the training, instructional materials, and infrastructure for nearly 3000 teacher preparation majors to create electronic portfolios is well under way at our university.

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